Washington State Building Code Council • Code Change Cycle 2009

Washington State Energy Code

Log #	Proponent	Code Section(s)	Title or Subject	TAG Review				Committee Action
				Policy Criteria	Objectives/ Energy Criteria	Economic Impact	Recommendation	
Residential								
09-066	Gary Nordeen	101.3	Townhouses	Withdrawn by Proponent 4/24/09				
09-067	Gary Nordeen	101.3.2.3	Change of use	**Withdrawn by Proponent 6/26/09**				
09-068	Gary Nordeen	101.3.2.5	Alterations	2, 5	A,C	+1 FC / -1 OC	AM 3/20 (see p. 8)	
09-069	Gary Nordeen	101.3.2.6	Mechanical alterations	2	A,C	+1 FC / -1 OC	AM 3/20 (see p. 9)	
09-070	Gary Nordeen	101.3.2.8	Lighting alterations	2, 5	AA,A,B	+1 FC / -1 OC	AS 3/20	
09-105	Kraig Stevenson	302	Thermal design parameters				D 3/20	
09-108	Robert Oylear	402.1.2	Energy consumption	**Withdrawn by Proponent 6/25/09**				
09-075	Gary Nordeen	502.1.4.7	Floor insulation	2	A,C	---	AS 3/20	
09-110	Nathan Miller	503.8	Thermostat controls	2/4	AA, C	+1 FC ,+0 EC ,-1 OC	AM 3/27 (see p. 11)	
09-080	Gary Nordeen	503.8.3.5	Heat pump controls	2	AA,B,C	+1 FC,EC/ -2 OC	AM 3/27 (see p. 10)	
09-005	John Hogan	402.1	Energy budget	**5**	**AA**	**---**	**AM 6/25 (see p. 61)**	
09-006	John Hogan	502.4.5	Air leakage testing				D 4/10	
09-008	John Hogan	503.10	Duct testing	Withdrawn by proponent 4/10/09				
09-111	Scott Rushing	504	Service water heating	2	B,C	+1 FC,EC -1 OC	AM 3/27 (see p. 12)	
09-112	Scott Rushing	504	Service water heating	2	AA	+1 FC,EC -1 OC	AM 3/27 (see p. 12)	
09-082	Gary Nordeen	504.2.1	Water heater efficiency	**Withdrawn by Proponent 6/25/09**				
09-083	Gary Nordeen	504.2.3	Service water efficiency	Withdrawn by proponent 3/27/09				
09-084	Gary Nordeen	504.5.1	Pool pumps	2	A,B,C	+1 FC / -1 OC	AM 3/27 (see p. 11)	
09-010	John Hogan	505.1	Lighting				D 4/17	
09-085	Gary Nordeen	505.1	Lighting	Withdrawn by proponent 4/17/09				
09-104	Kraig Stevenson	505.1	Lighting controls	Withdrawn by proponent 4/17/09				

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09-103	Kraig Stevenson	505.2	Lighting	Withdrawn by proponent 4/17/09				
09-141	Chuck Murray	T 5-1, 6-1, 6-2	Envelope requirements	2	AA, B	+1 FC, -1 OC	AM 4/24 (see p.19)	
09-169	Patrick Hayes	Tables 5-1, 6-1, 6-2	Prescriptive glazing	**Withdrawn by Proponent 6/26/09**				
09-171	Patrick Hayes	Tables 5-1, 6-1, 6-2	Prescriptive glazing	**Withdrawn by Proponent 6/26/09**				
09-102	Kraig Stevenson	503.2,603, Ch 8 & 9	System sizing	2/5	B	-1FC, -2 EC, -2OC	AM 4/24 (see p.18)	
09-140	Chuck Murray	Chapter 9	Energy efficiency requirements	2	AA	+2FC, +1 EC, -2OC	AM 5/15 (see p. 31)	
09-003	John Hogan	101.3.2.4	Alterations	5	F	---	AS 6/12	
09-071	Gary Nordeen	105.4	Certificate	5	F	---	AM 6/12 (See p. 53)	
09-004	John Hogan	201	Definition, AHRI	Editorial, covered by staff				
09-072	Gary Nordeen	201	Definitions	5	F	---	AS 6/12	
09-073	Gary Nordeen	302	Design temps	5	B,D,F	---	AM 3/20 (see p. 9)	
09-109	Robert Oylear	Chapter 4	Systems analysis	**Withdrawn by Proponent 6/25/09**				
09-074	Gary Nordeen	502.1.4.4	Insulation	5	F	---	AS 6/12	
09-166	Patrick Hayes	502.1.4.7	Floor insulation	**Withdrawn by Proponent 6/26/09**				
09-076	Gary Nordeen	502.1.4.8	Slab on grade	**5**	**F**	---	**AS 6/26**	
09-133	Chuck Murray	502.1.4.8	Slab insulation	**Withdrawn by Proponent 6/26/09**				
09-077	Gary Nordeen	502.1.4.9	Radiant slabs	5	F	---	AS 6/12	
09-078	Gary Nordeen	502.1.6.1	Vapor retarder	Withdrawn by Proponent 6/12/09				
09-059	Joe Andre	502.4.4	Recessed lighting	5	B	---	AM 6/12 (See p. 53)	
09-134	Chuck Murray	502.4.5	Air leakage testing	2	AA, A, B	+1 FC,EC -1 OC	AM 4/10 Mod further 6/5 (see p. 12, 52)	
09-007	John Hogan	503.1	General	**Withdrawn by Proponent 6/26/09**				
09-079	Gary Nordeen	503.2.2	System sizing	5	B,F	---	AM 3/27 (see p. 10)	
09-107	Jonathan Heller	503.2.2	Corridor ventilation				**D 6/26**	
09-135	Chuck Murray	503.4.1	Fan power	2	AA, B	+1 FC,EC -1 OC	AM 6/12 (see p. 53)	
09-136	Chuck Murray	503.5	Ventilation fan efficiency	Withdrawn by Proponent 6/12/09				

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09-137	Chuck Murray	503.8.3.5	Heat pump controls	See 09-080				
09-138	Chuck Murray	503.9	Duct insulation	2	AA, B	+1 FC, EC -1 OC	AS 6/12	
09-081	Gary Nordeen	503.10	Ducts	2	AA,B	+1 FC / -1 OC	AM 3/27 (see p. 11)	
09-139	Chuck Murray	505	Lighting	2	AA, B, C	+1 FC, EC -1 OC	AM 4/17, 6/26 (see p. 15)	
09-086	Gary Nordeen	506	Energy consumption	**Withdrawn by Proponent 6/26/09**				
09-164	Patrick Hayes	Table 5-1	Ceiling insulation	**Withdrawn by Proponent 6/26/09**				
09-163	Patrick Hayes	Tables 6-1, 6-2	Ceiling insulation	**Withdrawn by Proponent 6/26/09**				
09-168	Patrick Hayes	Table 10-6	Operable windows	**Withdrawn by Proponent 6/26/09**				
09-087	Gary Nordeen	602.2	Exterior wall insulation	2	B, C	---	AM 6/19 (see p. 53)	
09-088	Gary Nordeen	602.5	Unvented crawlspace	Withdrawn by Proponent 6/19/09				
09-089	Gary Nordeen	602.7.2	Ornamental glazing	**2**	**D**	---	**AM 6/25 (see p. 63)**	
09-091	Gary Nordeen	Chapter 8	Systems analysis software	**5**	**F**	---	**AM 6/25 (see p. 63)**	
Res & Non-Res Applicability								
09-002	John Hogan	101, 201, 401, 402, 502, 505, 601, 602, 603, 606, 1008, 1133	Residential scope, technical changes	2	AA, B	+0FC, +0EC, -0OC	AM 4/24 (see p.16)	
09-009a	John Hogan	504/1440	Service water	**2**	**AA**	**+1FC, EC -1 OC**	**AM 6/25 (see p. 62)**	
09-011	John Hogan	701	Standards	**5**	**B**	---	**AM 6/25 (see p. 62)**	
09-090	Gary Nordeen	Chapter 7	Standards	Withdrawn by Proponent 6/25/09; See 09-011				
09-115	Scott Rushing	Chapter 7	EnvStd				**D 6/25**	
09-113	Nathan Miller	504/1440	Water heater efficiency	**2,5**	**AA, BB**	**-1 OC**	**AS 6/25**	
09-114	Nathan Miller	504/1440	Flow rates	Withdrawn by Proponent 5/27/09				
09-048	John Hogan	Tables 14-6 / 5-12	Pipe insulation	**2**	**AA, BB**	---	**AS 6/25**	
09-022	John Hogan	1311.2/502.1.4	Rigid insulation	**2**	**AA, BB**	**+1FC, EC -1 OC**	**AS 6/25**	
Default Tables								

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09-116	Robert Oylear	Table 10-5A	Continuous insulation	**5**	**B,F**	---	**AS 6/25**	
09-117	Robert Oylear	Tables 10-6C & 10-6D	Door default U-factors	Withdrawn by Proponent 6/25/09				
09-012	John Hogan	Table 10-A	Compressed R-values	**5**	**B,F**	---	**AS 6/25**	
09-013	John Hogan	Table 10-2	F-Factor defaults	Withdrawn by Proponent 6/25/09				
09-014	John Hogan	1004.2	Crawlspaces	**5**	**B,F**	---	**AS 6/25**	
09-015	John Hogan	1005	Above grade walls	**5**	**B,C,F**	---	**AS 6/25**	
09-016	John Hogan	1006	Default tables	**5**	**B,C**	**-1 EC**	**AM 6/25 (See p. 50, 67)**	
09-017	John Hogan	1007	Ceilings	**2,5**	**B,F**	---	**AS 6/25**	
Non-Res Envelope								
09-018	John Hogan	1120/101.3	Scoping	2	D	+0FC,+1 EC, -1OC	AS 5/15	
09-025	John Hogan	1314.7	Air barrier	2	BB	+2FC, +1 EC, -1OC	AM 5/15 (See p. 29)	
09-118	Gaurav Mehta	1320/1330	Glazing percentage	Withdrawn by Proponent 6/26/09				
09-030	John Hogan	1323.4	Visible transmittance				D 5/22	
09-031	John Hogan	T 13-1 /13-2	Envelope requirements	2,3	AA,BB, B	Up to +2FC +1 EC, -1 OC	AM 5/22 (See p. 35)	
09-058	Robert Oylear	Tables 13-1/ 13-2	Maximum glazing area	Withdrawn by Proponent 5/15/09				
09-170	Patrick Hayes	Table 13-1	Compliance options	**2**	**F**	---	**AM 6/26 (see p. 72)**	
09-020	John Hogan	Chapter 12	Energy metering	**2**	**BB**	**+1FC, EC -1 OC**	**AM 6/26 (see p. 68)**	
09-021	John Hogan	1310.2	Semi-heated spaces	**5**	**BB, F**	**+1FC, EC -1 OC**	**AS 6/26**	
09-143	Chuck Murray	1310.3/1480	Cold storage	**2**	**BB**	**+1FC, EC -1 OC**	**AM 6/26 (see p. 70)**	
09-023	John Hogan	1312.2	SHGC	Withdrawn by Proponent 6/26/09				
09-024	John Hogan	1314	Air sealing	**2,3**	**BB**	**+2FC, +1EC -1 OC**	**AS 6/26**	
09-026	John Hogan	1322	Envelope compliance	**2, 5**	**BB, F**	**+1FC, EC -1 OC**	**AM 6/26 (see p. 71)**	
09-167	Patrick Hayes	1322	Glazing area	**5**	**D**	---	**AM 6/26 (see p. 71)**	
09-027	John Hogan	1323	Glazing	**2, 5**	**BB, F**	**+1FC**	**AM 6/26 (see p. 69)**	

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09-142	Chuck Murray	1323	Glazing	Withdrawn by Proponent 6/26/09				
09-028	John Hogan	1323.3	SHGC/proj factor	**5**	**B**	**---**	**AS 6/26**	
09-119	Robert Oylear	Tables 13-1/ 13-2	Slab insulation	**5**	**D**	**-2FC, -1EC**	**AM 6/25 (see p. 64)**	
09-120	Robert Oylear	Tables 13-1/ 13-2	Doors	Withdrawn by Proponent 6/25/09				
09-165	Patrick Hayes	Tables 13-1, 13-2	Floor insulation				**D 6/26**	
Non-Res Mechanical								
09-032	John Hogan	1411.1	High-efficiency or on-site generation				**D 6/19**	
09-123	Scott Rushing	1412	Ventilation controls	BB	C	+1 F,E,O costs	AS 5/29	
09-036	John Hogan	1412.4.3	Window interlocks				D 5/01	
09-172	Treasa Sweek	1416	Commissioning	2	BB, A	+1 FC, -2 OC	AM 6/19 (see p. 54)	
09-040	John Hogan	1431.2/1421.1	Sizing limits	2	B	+1 EC	AS 5/08	
09-041	John Hogan	1433/1423	Economizers	2	B, BB	+2FC, +1 EC, - 1OC	AM 5/08 (see p. 26)	
09-124	Scott Rushing	1433	Economizers	Withdrawn by proponent 5-08-08 See 09-132				
09-043	John Hogan	1436	Heat recovery	2	B, BB	+2FC, +1 EC, - 1OC	AM 5/08 (See p. 28)	
09-044	John Hogan	1437	Motor efficiency	2	B, BB	+1FC, +1 EC, - 1OC	AS 5/08	
09-046	John Hogan	1439.1	Kitchen hood make up air				D 5/22	
09-019	John Hogan	1132	Existing mechanical	2	A, B	+1FC, +1 EC, - 1OC	AS 6/19	
09-033	John Hogan	1411.2	HVAC efficiency			+1 FC	AS 5/22	
09-145	Chuck Murray	1411.2.1	Non-standard chillers	2	BB, B, C	+1 FC, -1 OC	AM 6/19 (see p. 57)	
09-034	John Hogan	1411.5	Unenclosed spaces	2	B, F	+1 FC, -1 OC	AM 6/19 (see p. 58)	
09-122	Eric Vander Mey	1411	Chiller efficiency				D 6/19	
09-131	Rand Conger	1411	Equipment efficiency	Withdrawn by proponent 5-08-08 See 09-161				
09-144	Chuck Murray	1411	Chilled water requirements	2	B, BB	+1 FC, -1 OC	AM 5/22 (See p. 40)	
09-125	Robert Oylear	Chapter 14	Condensing unit efficiency				D 5/22	

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09-161	Chuck Murray	Chapter 14	Equipment efficiencies	2	B	+1 FC, -1 OC	AS 5/08	
09-121	Nathan Miller	Table 14-1F	Boiler efficiency				D 5/08	
09-126	Robert Oylear	Tables 14-1A/ 14-1B	Equipment efficiency	2,3	B	---	AS 5/22	
09-146	Chuck Murray	1412.1	Temperature controls	**2**	**A,C,F**	**+1 FC, -1 OC**	**AM 6/19 (see p. 58)**	
09-035	John Hogan	1412.4.1	Dampers				**D 6/25**	
09-148	Chuck Murray	1412.4.1	Dampers				**AS 6/25**	
09-147	Chuck Murray	1412.4	Setback and Shut off	**2**	**BB**	**+1 FC,EC -1 OC**	**AM 6/25 (see p. 64)**	
09-149	Chuck Murray	1412.5	Heat pump controls	**2**	**BB**	**+1FC, -1OC**	**AM 6/25 (see p. 64)**	
09-150	Chuck Murray	1412.8	Ventilation controls/DCV	2	BB, C	+1FC, +1 EC, -2OC	AM 6/19 (see p. 58)	
09-037	John Hogan	1413.1	Economizer operation				**AS 6/25**	
09-038	John Hogan	1414.1	Duct sealing				**D 6/25**	
09-151	Chuck Murray	1414.1	Duct sealing	**2**	**BB, B**	**+1FC, EC -1 OC**	**AM 6/25 (see p. 65)**	
09-152	Chuck Murray	1415.2	Pipe sizing	Withdrawn by Proponent 6/12/09				
09-039	John Hogan	1421	Simple systems				D 6/19	
09-153	Chuck Murray	1421, 1435, 1432	Complex system controls	2	BB, C	+1 FC, -1 OC	AM 6/19 (see p. 59)	
09-154	Chuck Murray	1432.3, 1432.4, 1416.2	Pump energy	**2**	**BB**	**+1 FC, -2 OC**	**AM 6/26 (see p. 71)**	
09-001	ACCA	1423 / 1433	Economizers				D 5/29	
09-132	Rand Conger	1433	Economizers	2	B, C	---	AM 5/08 (See p. 29)	
09-042	John Hogan	1435	Simultaneous heating & cooling				D 6/19	
09-155	Chuck Murray	1436	Heat recovery	Withdrawn by Proponent 5/08/09				
09-156	Chuck Murray	1436	Exhaust heat recovery	Withdrawn by Proponent 5/08/09 See 09-043				
09-157	Chuck Murray	1438	System criteria	2	B,C, BB	+1FC, -2 OC	AM 6/19 (see p. 59)	
09-045	John Hogan	1438/1432.2.2	Variable speed motors				D 6/19	
09-158	Chuck Murray	1438.3	Fan power limitation				D 6/19	
09-159	Chuck Murray	1439	Exhaust systems	**2**	**BB, C**	**+1 FC, -1 OC**	**AM 6/25 (see p. 66)**	

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09-047	John Hogan	1454	Pools	2	B	+1FC,EC -1 OC	AS 6/19	
09-160	Chuck Murray	1455	Heat recovery	2	CC, C	+1 FC, -1 OC	AS 6/12	
09-106	Kraig Stevenson	1511.1	Energy consuming mechanisms	2	BB, C	+1 FC, -1OC	AM 5/29 (see p. 40)	
Non-Res Lighting								
09-060	Michael Lane	1132.3	Lighting alterations	2	C	+1 FC +0 EC -1 OC	AM 4/17 (see p. 14)	
09-049	John Hogan	1512	Exempt lighting	2	BB, B	+1 FC/EC -1 OC	AM 4/17 (see p. 13)	
09-127	Robert Oylear	1513	Sleeping unit controls				D	
09-050	John Hogan	1513.3	Daylight zones	Withdrawn by proponent 4/17/09				
09-061	Michael Lane	1513.3	Daylighting controls	2	BB, C	+1 FC +0 EC -1 OC	AM 4/17 (see p. 14)	
09-051	John Hogan	1513.6	Lighting controls	2	BB, B,C	+1 FC +1 EC -1 OC	AM 5/01 (see p. 23)	
09-064	Michael Lane	1531	LPA	2, 3	BB, B, C	+1 FC +1 EC -1 OC	AM 5/01 (see p. 24)	
09-065	Michael Lane	1532	Exterior lighting	2, 3	B, C	+0 FC, EC -2 OC	AS 4/17	
09-054	John Hogan	Table 15-1	LPA				D (See 09-064)	
09-162	Chuck Murray	1510.1	Luminaire cutoff				D	
09-057	**Boeing**	**1512.1**	**Exempt lighting**	**4**	**D**	**-3 OC**	**AM 6/26 (see p. 70)**	
09-062	**Michael Lane**	**1513.6**	**Automatic controls**	**2,3**	**B, BB**	**+1 FC -1 OC**	**AM 6/26 (see p. 70)**	
09-052	**John Hogan**	**1515**	**Egress lighting**	**Withdrawn by Proponent 6/26/09**				
09-063	**Michael Lane**	**1530**	**LPA**	**2,3**	**B**	**-1 OC**	**AS 6/26**	
09-053	**John Hogan**	**1532**	**Exterior lighting**	**Withdrawn by Proponent 6/26/09**				
09-128	**Gaurav Mehta**	**Table 15-1**	**LPA**	**2**	**BB**	**-1 FC, OC**	**AS 6/26**	
RS-29								
09-055	**John Hogan**	**RS29 2.1**	**Energy analysis**	**Withdrawn by Proponent 6/25/09**				

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09-056	John Hogan	RS29 3.3.1	Insulation & glazing				D 5/01	
09-129	Robert Oylear	RS29	Systems analysis	2,3	B	-2 FC	AM 5/29 **AM 6/25 (see p. 41)**	
09-130	Gaurav Mehta	RS29 Sec 4	Software	5	F	---	AM 5/01 (see p. 25)	
Other								
09-092	**Kraig Stevenson**	**All**	**Replace with IECC**				**D 6/26**	
09-093	**Kraig Stevenson**	**All**	**Replace with IECC**				**D 6/26**	
09-094	**Kraig Stevenson**	**IECC 402.1.4**	**UA alternative**				**D 6/26**	
09-095	Kraig Stevenson	IECC 403.6.1	Performance requirements				D 5/29	
09-096	**Kraig Stevenson**	**IECC 404.1**	**Lighting**	**Withdrawn by Proponent 6/26/09**				
09-097	Kraig Stevenson	IECC 301.1	Climate zones				**D 6/26**	
09-098/099	Kraig Stevenson	IECC 501.2, 507	Energy consuming mechanisms	To be submitted as IECC Code Change with SBCC as proponent 2 BB,C +1FC,-1OC			AM 5/29 (See 09-106, p. 40)	
09-100	**Kraig Stevenson**	**IECC 402.3.1**	**Glazing percentage**				**D 6/26**	
09-101	Kraig Stevenson	IECC 505.2.2.2	Lighting controls	To be submitted as IECC Code Change with SBCC as proponent			AM 5/29 (see p. 40)	

March 20, 2009

Log # 09-068:
Recommend Approval with Modifications:

101.3.2.5 Building Envelope: The result of the alterations or repairs both:

1. Improves the energy efficiency of the building, and
2. Complies with the overall average thermal transmittance values of the elements of the exterior building envelope in Table 5-1 of Chapter 5, or the nominal R-values and glazing requirements of the reference case in Tables 6-1 and 6-2 of Chapter 6.

EXCEPTIONS: 1. Untested storm windows may be installed over existing glazing for an assumed U-factor of 0.90, however, where glass and sash are being replaced in Group R Occupancy, glazing shall comply with the appropriate reference case in Tables 6-1 and 6-2.

2. Where the structural elements of the altered portions of roof/ceiling, wall or floor are not being replaced, these elements shall be deemed to comply with this Code if all existing framing cavities which are exposed during construction are filled to the full depth with batt insulation or insulation having an equivalent nominal R-value. 2 x 4 framed walls shall be insulated to a minimum of R-15 and 2 x 6 framed walls shall be insulated to a minimum of R-21. ~~while, for r~~ Roof/ceilings~~,~~ assemblies shall maintain~~ing~~ the required space for ventilation. Existing walls and floors without framing cavities need not be insulated. Existing roofs shall be insulated to the requirements of this Code if:
   a. The roof is uninsulated or insulation is removed to the level of the sheathing, or
   b. All insulation in the roof/ceiling was previously installed exterior to the sheathing or nonexistent.

Log # 09-069:
Recommend Approval with Modifications:

101.3.2.6 Building Mechanical Systems: Those parts of systems which are altered or replaced shall comply with Section 503 of this Code. W~~w~~hen a space-conditioning system is altered by the installation or replacement of space-conditioning equipment (including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger), the duct system that is connected to the new or replacement space-conditioning equipment shall be sealed, as confirmed through field verification and diagnostic testing in accordance with procedures for duct sealing of existing duct systems as specified in ~~the~~ RS-35~~,~~. The test results shall confirm at least ~~to~~ one of the following performance requirements~~.~~:

1. The measured total duct leakage shall be less than or equal to 8% of the conditioned floor area, measured in CFM @ 25 pascals; or
2. The measured duct leakage to outside shall be less than 6% of the conditioned floor area, measured in CFM @ 25 pascals; or
3. The measured duct leakage shall be reduced by more than 50% relative to the measured leakage prior to the installation or replacement of the space conditioning equipment and a visual inspection including a smoke test shall demonstrate that all accessible leaks have been sealed; or
4. If it is not possible to meet the duct requirements of 1, 2 or 3, all accessible leaks shall be sealed and verified through a visual inspection and through a smoke test by a certified third party.
   EXCEPTIONS: 1. Duct systems that are documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in RS-35.
   2. Ducts with less than 40 linear feet in unconditioned spaces.
   3. Existing duct systems constructed, insulated or sealed with asbestos.

Log # 09-073:
Recommend Approval with Modifications:

302.1 Exterior Design Conditions: The heating or cooling outdoor design temperatures shall be selected from ~~0.6% column for winter and 0.5% column from~~ Table 3-1. ~~for summer from the Puget Sound Chapter of ASHRAE publication "Recommended Outdoor Design Temperatures, Washington State, ASHRAE." (See also Washington State Energy Code Manual.)~~

TABLE 3-1

Location	Outdoor Design Temp.(ºF) (heating) ~~.6%~~	Outdoor Design Temp. (ºF) (cooling) ~~.5%~~	Location	Outdoor Design Temp. (ºF) (heating) ~~.6%~~	Outdoor Design Temp. (ºF) (cooling) ~~.5%~~

(Portions of proposal not shown remain as submitted)

March 27, 2009

Log # 09-079:
Recommend Approval with Modifications:

503.2.2 Space Heating and Space Cooling System Sizing Limits: Building mechanical systems for all buildings which provide space heating and/or space cooling shall be sized no greater than 150% of the heating and cooling design loads as calculated above.

EXCEPTIONS: The following limited exemptions from the sizing limit shall be allowed; however, in all cases heating and/or cooling design load calculations shall be submitted.

1. For equipment which provides both heating and cooling in one package unit, including heat pumps with electric heating and cooling and gas-pack units with gas heating and electric cooling, compliance need only be demonstrated for either the space heating or space cooling system size, whichever load is larger.
2. Natural gas- or oil-fired space heating equipment whose total rated space heating output in any one dwelling unit is
   a. 40,000 Btu/h or less is exempt from the sizing limit.
   b. larger than 40,000 Btu/h may exceed the 150% sizing limit but not exceed 250% provided that the installed equipment has an annual fuel utilization efficiency (AFUE) of 90% or greater.
3. Stand-by equipment may be installed if controls and other devices are provided which allow redundant equipment to operate only when the primary equipment is not operating.

Log # 09-080:
Recommend Approval with Modifications:

503.8.3.5 Heat Pump Controls: ~~Programmable thermostats are required for all heat pump systems. The cut-on temperature for the compression heating shall be higher than the cut-on temperature for the supplementary heat, and the cut-off temperature for the compression heating shall be higher than the cut-off temperature for the supplementary heat. Heat pump thermostats will be capable of providing at least two programmable setback periods per day. The automatic setback thermostat shall have the capability of limiting the use of supplemental heat during the warm-up period.~~

Heat pumps with supplementary electric resistance heaters shall have controls:

1. That prevent supplementary heater operation when the heating load can be met by the heat pump alone; and
2. In which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.

All heat pumps installed under this section shall include the capability to lock out the supplementary heat based on outdoor temperature. This control shall have a maximum setting of 40°F. At final inspection, the lock out control shall be set to 32 degrees F or less.

EXCEPTION~~S~~: The controls may allow supplementary heater operation during defrost.~~:~~

~~1. Defrost; and~~

~~2. Transient periods such as start-ups and following room thermostat setpoint advance, if the controls provide preferential rate control, intelligent recovery, staging, ramping or another control mechanism designed to preclude the unnecessary operation of supplementary heating.~~

Log # 09-081:
Recommend Approval with Modifications:

503.10 Ducts

503.10.1~~/2~~ Installation of ducts in exterior walls, floors, or ceilings shall not displace required envelope insulation.

Building cavities may not be used as ducts.

503.10.~~1~~ 2 Leakage Testing: ~~High pressure and medium pressure~~ ~~d~~Ducts shall be leak tested in accordance with ~~the 1985 Edition of the SMACNA HVAC Air Duct Leakage Test Manual with the rate of air leakage not to exceed the maximum rate specified in that standard.~~ RS-35 using the maximum duct leakage rates specified in 503.10.~~23~~.

(Renumber subsequent sections)

Log # 09-084:
Recommend Approval with Modifications:

504.5 Swimming Pools

504.5.1 Controls: All pool heaters shall be equipped with readily accessible ON/OFF switch to allow shutting off the operation of the heater without adjusting the thermostat setting. Controls shall be provided to allow the water temperature to be regulated from the maximum design temperature down to 65°F.

504.5.2 Residential Pool Pumps.
Motor Efficiency. Pool pump motors ~~manufactured on or after January 1, 2006~~ may not be split-phase or capacitor start – induction run type.

Two-Speed Capability.
(1) **Pump Motors.** Pool pump motors with a capacity of 1 HP or more ~~which are manufactured on or after January 1, 2008,~~ shall have the capability of operating at two or more speeds with a low speed having a rotation rate that is no more than one-half of the motor's maximum rotation rate.
(2) **Pump Controls.** Pool pump motor controls ~~manufactured on or after January 1, 2008~~ shall have the capability of operating the pool pump with at least two speeds. The default circulation speed shall be the lowest speed, with a high speed override capability being for a temporary period not to exceed one normal cycle.

Portable Electric Spas. The standby power of portable electric spas ~~manufactured on or after January 1, 2006,~~ shall not be greater than 5(V2/3) watts where V = the total volume, in gallons.

504.5.~~2~~ 3 Pool Covers: Heated swimming pools shall be equipped with a pool cover, approved by the building official.

Log # 09-110:
Recommend Approval with Modifications:

503.8.1 Temperature Control: The primary space conditioning system within each dwelling unit shall be provided with at least one programmable thermostat for the regulation of temperature. The thermostat shall allow for, at a minimum, a 5-2 programmable schedule (weekdays/weekends) and be capable of providing at least two programmable setback periods per day.

Each additional system provided within a dwelling unit~~(including electric resistance baseboards)~~ shall be provided with at least one ~~adjustable~~ ~~ENERGY STAR rated programmable~~ adjustable thermostat for the regulation of temperature. The thermostat shall allow for, at a minimum, a 5-2 programmable schedule (weekdays/weekends).

EXCEPTIONS:
1. Systems controlled by an occupant sensor that is capable of shutting the system off when no occupant is sensed for a period of up to 30 minutes.
2. Systems controlled solely by a manually operated timer capable of operating the system for no more than two hours.

Each thermostat shall be capable of being set by adjustment or selection of sensors as follows:
503.8.1.1: When used to control heating only: 55°F to 75°F.

503.8.1.2: When used to control cooling only: 70°F to 85°F.

(Portions of proposal not shown remain as submitted)

Log # 09-111:
Recommend Approval with Modifications:

504.9 Heat Recovery for Service Water Heating: Condenser water heat recovery systems shall be installed for heating or preheating of service hot water provided all of the following are true:

1. The total installed heat rejection capacity of the water-cooled systems exceeds ~~3,000,000~~ 1,500,000 Btu/h of heat rejection, and
2. The capacity of service water heating equipment exceeds ~~500~~ 250,000 Btu/h.

The required heat recovery system shall have the capacity to provide the smaller of:

a. 60% of the peak heat rejection load at design conditions, or
b. preheat of the peak service hot water draw to 85°F, or
c. 50% of the service water heating load.

EXCEPTIONS:

1. Facilities that employ condenser heat recovery for space heating with a heat recovery design exceeding 30% of the peak water-cooled condenser load at design conditions.
2. Facilities that provide 60% of their service water heating from site solar or site recovered energy or from other sources.

Log # 09-112:
Recommend Approval with Modifications:

504.8.2 Domestic Hot Water Meters: Each individual ~~residence~~ dwelling unit in a Group R-2 Multi family residential ~~occupancies~~ occupancy with central service shall be provided with a domestic hot water meter to allow for domestic hot water billing based on actual domestic hot water usage.

April 10, 2009

Log # 09-134:
Recommend Approval with Modifications:

Section 502.4.5. Building Air Leakage Testing. Building envelope air leakage control shall be considered acceptable when tested to have an air leakage is less than 0.00030 Specific Leakage Area (SLA) when tested with a blower door at a pressure of 50 pascals (0.2 inch w.g.). Testing shall occur any time after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and combustion appliances and sealing thereof. When required by the building official, the test shall be conducted in the presence of department staff. The blower door test results shall be recorded on the certificate required in section 105.4.

Exception: Additions less than 750 square feet.

Specific Leakage Area (SLA) shall be calculated as follows:

SLA = (CFM50 x 0.055) / (CFA x 144)

Where:
CFM50 = Blower door fan flow at 50 Pascal pressure difference
CFA = Conditioned Floor Area of the housing unit

During testing:
1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;

2. Dampers shall be closed, but not sealed; including exhaust, intake, makeup air, back draft, and flue dampers;
3. Interior doors connecting conditioned spaces shall be open; access hatches to conditioned crawl spaces and conditioned attics shall be open; doors connecting to unconditioned spaces closed but not sealed;
4. Exterior openings for continuous operation ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts supply and return registers shall not be sealed.
~~7. For multi-unit structures with hall pressurization systems, this system shall be turned off during testing.~~

~~**Exception: Multi-unit buildings.** Only one unit shall be tested in multi-unit buildings. The unit selected shall be the unit with the greatest gross exterior wall + ceiling area, or by an alternate criteria specified by the building inspector.~~

602.8 Air Leakage for Group R Occupancy: The minimum air leakage control measures shall be as specified in Section 502.4 as applicable, including building envelope air leakage testing.

April 17, 2009

Log # 09-049:
Recommend Approval with Modifications:

1512.2 Exempt Lighting Equipment: The following lighting equipment and tasks are exempt from the lighting requirements of Section 1520 through 1522 and need not be included when calculating the installed lighting power under Section 1530 through 1532 but shall comply with all other requirements of this chapter. All other lighting in areas that are not exempted by Section 1512.2, where exempt tasks and equipment are used, shall comply with all of the requirements of this chapter.

1. Special lighting needs for research.
2. Emergency lighting that is automatically OFF during normal building operation.
3. Lighting that is part of machines, equipment or furniture.
4. Lighting that is used solely for indoor plant growth during the hours of 10:00 p.m. to 6:00 a.m. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
5. Lighting for theatrical productions, television broadcasting (including sports facilities), ((~~audio-visual presentations~~)) and special effects lighting for stage areas and dance floors in entertainment facilities. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
6. Lighting in galleries, museums and in main building entry lobbies for ((~~art~~)) exhibits, ((~~non-retail displays, portable plug-in display fixtures and show case lighting~~)) inspection, and restoration. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
7. Lighting specifically designed for use ~~only~~ during medical or dental procedures and lighting integral to medical equipment. However, such lighting shall not be exempt unless it is in addition to general area lighting, designed specifically for medical lighting, and is controlled by an independent control device. Use of a portion of the lamps in a multi-lamp fixture, provided those lamps have an independent control device, shall be permitted.
8. Lighting integral to food warming equipment or specifically for ~~food warming and~~ food preparation ~~equipment~~. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
9. Audio-visual and video-conferencing lighting with multi-level or dimming controls in rooms with permanently installed audio-visual equipment or video-conferencing equipment.
10. Permanently-installed undershelf or undercabinet lighting that has an automatic shutoff control device integral to or is directly attached to the luminaires or is automatically controlled by a wall-mounted control device that turns off the lighting whenever that particular space is unoccupied. Other permanently-installed undershelf or undercabinet

lighting that is not automatically controlled is not exempt and other partition-mounted lighting that is providing general illumination is not exempt and shall be included when determining compliance with the lighting requirements of Section 1520 through 1522 and Section 1530 through 1532.

11. Lighting used for aircraft painting.

(Portions of proposals not shown remain as submitted)

Log # 09-060:
Recommend Approval with Modifications:

1132.3 Lighting and Motors: Where the use in a space changes from one use in Table 15-1 to another use in Table 15-1, the installed lighting wattage shall comply with Section 1521 or 1531.

~~The alteration of lighting systems in any building space or exterior area shall comply with the lighting power density (LPD) requirements of Section 1531 and 1532 applicable to that space or area. Such alterations shall include all luminaires that are added, replaced or removed. This requirement shall also be met for alterations that involve just the lamps plus ballasts. Alterations do not include routine maintenance or repair situations.~~

~~Exception: Alterations that involve less than 20% of the connected lighting load in a space or area need not comply with these requirements provided that such alterations do not increase the installed LPD.~~

Other tenant improvements, alterations or repairs where ~~60~~ 20 percent or more of the fixtures in a space enclosed by walls or ceiling-height partitions are altered, added or replaced~~new~~ shall comply with Sections 1531 and 1532. (Where this threshold is triggered, the areas of the affected spaces may be combined for lighting code compliance calculations.) This requirement shall also be met for alterations that involve just the lamps plus ballast. Where less than ~~60~~ 20 percent of the fixtures in a space enclosed by walls or ceiling-height partitions are new, the installed lighting wattage shall be maintained or reduced. Where 60 percent or more of the lighting fixtures in a suspended ceiling are new, and the existing insulation is on the suspended ceiling, the roof/ceiling assembly shall be insulated according to the provisions of Chapter 13, Section 1311.2.

Any new lighting control devices shall comply with the requirements of Section 1513. Where new wiring is being installed to serve added fixtures and/or fixtures are being relocated to a new circuit, controls shall comply with Sections 1513.1 through 1513.5 and, as applicable, 1513.7. In addition, office areas less than 300 ft^2 enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, shall be equipped with occupancy sensors that comply with Section 1513.6 and 1513.7. Where a new lighting panel (or a moved lighting panel) with all new raceway and conductor wiring from the panel to the fixtures is being installed, controls shall also comply with the other requirements in Sections 1513.6 and 1513.7.

Where new walls or ceiling-height partitions are added to an existing space and create a new enclosed space, but the lighting fixtures are not being changed, other than being relocated, the new enclosed space shall have controls that comply with Sections 1513.1 through 1513.2, 1513.4, and 1513.6 through 1513.7.

Those motors which are altered or replaced shall comply with Section 1511.

Log # 09-061:
Recommend Approval with Modifications:

DAYLIGHTED ZONE:

a. **Under overhead glazing**: the area under overhead glazing whose horizontal dimension, in each direction, is equal to the overhead glazing dimension in that direction plus either ~~the~~ 70 percent of the floor to ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent overhead or vertical glazing, whichever is least.

b. **At vertical glazing**: the area adjacent to vertical glazing which receives daylighting from the glazing. For purposes of this definition and unless more detailed daylighting analysis is provided, the primary ~~daylighting~~ daylighted zone depth ~~is assumed to~~ extends into the space a distance ~~of 15 feet~~ equal to the ~~ceiling~~ window head height and the secondary daylighted zone extends from the edge of the primary zone to a distance equal to two times the window head height, or to the nearest ceiling height opaque partition, whichever is less. The daylighting zone

width is assumed to be the width of the window plus either two feet on each side (the distance to an opaque partition) or one-half the distance to adjacent overhead or vertical glazing, whichever is least.

1513.3 Daylight Zone Control: All daylighted zones, as defined in Chapter 2, both under overhead glazing and adjacent to vertical glazing, shall be provided with individual controls, or daylight- or occupant-sensing automatic controls, which control the lights independent of general area lighting.

In all areas with skylights, monitors or other fenestration at or above ceiling level and in all areas with windows, ~~where the daylighted zone is greater than 150 square feet,~~ all permanent luminaries in the daylighted zone shall be controlled by automatic daylight sensing controls. The primary daylighted zone shall be controlled separately from the secondary daylighted zone.

Automatic daylight sensing controls shall:

1. Be capable of reducing the light output of the controlled luminaries while maintaining a uniform level of illuminance ~~and provide an automatic OFF control~~ by either;

a. continuous dimming to at least 20% light output, or

b. step switching of each lamp in individual luminaires (non-continuous dimming devices shall have adjustable separation [deadband] of on and off points to prevent short cycling) and provide an automatic OFF control, switching alternate luminaires is not permitted except with single lamp luminaires, or

c. step dimming by reducing the output of all of the lamps in individual luminaires by at least 50 percent and provide an automatic OFF control.

2. Control only luminaires within the daylit area

3. Incorporate time-delay circuits to prevent cycling of light level changes of less than three minutes.

Any switching devices installed to override the automatic daylighting control shall comply with the criteria in Section 1513.6.2a-e.

Contiguous daylight zones adjacent to vertical glazing are allowed to be controlled by a single controlling device provided that they do not include zones facing more than two adjacent cardinal orientations (i.e. north, east, south, west). Daylight zones under overhead glazing ~~more than 15 feet from the perimeter~~ shall be controlled separately from daylight zones adjacent to vertical glazing.

EXCEPTION: ~~Daylight spaces enclosed by walls or ceiling height partitions and containing 2 or fewer light fixtures are not required to have a separate switch for general area lighting.~~ The following are exempt from the requirements for automatic daylighting controls in Section 1513.3:

1. Retail spaces adjacent to vertical glazing (retail spaces under overhead glazing are not exempt).

2. Lighting exempted by Section 1512.

3. Display, exhibition and specialty lighting complying with Section 1513.4

4. The following spaces are exempt from the requirements for automatic daylighting controls in Section 1513.3.2 provided that they have occupancy sensor controls that comply with Section 1513.6.1:

   a. small spaces in the daylight zone that are normally unoccupied (such as a storage room with a window, or restrooms),

   b. rooms less than 300 square feet, and

   c. Conference rooms 300 square feet and larger that have a lighting control system with at least four scene options and an occupancy sensor control that complies with Section 1513.6.1.

5. HID lamps with automatic controls that are capable of reducing the power consumption by at least 50%.

6. HID lamps 100 watts or less.

Log # 09-139:
Recommend Approval with Modifications:

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts,
2. 50 lumens per watt for lamps over 15 watts to 40 watts, and
3. 40 lumens per watt for lamps 15 watts or less.

(Reinstated 6/26)

HIGH EFFICACY LUMINAIRE: A lighting fixture that does not contain a medium screw base socket (E24/E26) and whose lamps or other light source have a minimum efficiency of:

a. 60 lumens per watt for lamps over 40 watts;
b. 50 lumens per watt for lamps over 15 watts to 40 watts;
c. 40 lumens per watt for lamps 15 watts or less.

SECTION 505 — LIGHTING

505.1 ~~Lighting Controls:~~ ~~Hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles.~~

~~505.2~~ Interior Lighting ~~Power~~: A minimum of 50% of all luminaires shall have a high efficacy lamp. *(reinstated 6/26)*

EXCEPTION:

1. Lighting ~~shall comply~~ that complies with the Prescriptive Lighting Option in Section 1520 or the Lighting Power Allowance Option in Section 1530.

~~2. Lighting in Dwelling units in Group R occupancies that achieve a connected lighting power of 1.1 Watts per square foot calculated in accordance with Section 1513 of this code~~

~~**EXCEPTIONS:** 1. Group R-3 and R-4 Occupancies and the dwelling unit portions of Group R-1 and R-2 Occupancies.~~

~~2. Lighting exempted by Section 1512.~~

~~505.3 Outdoor~~ 505.2 Exterior Lighting: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires.

EXCEPTIONS: 1. Permanently installed outdoor luminaires that are not high efficacy shall be allowed provided they are controlled by a motion sensor(s) with integral photocontrol photosensor.

2. Permanently installed luminaires in or around swimming pools, water features.

~~505.4~~ 505.3 Linear Fluorescent Fixtures: Linear fluorescent fixtures must be fitted with T-8 or smaller lamps (but not T-10 or T-12 lamps).

~~505.5~~ 1513.7 Lighting Controls: Hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles.

April 24, 2009

Log # 09-002:
Recommend Approval with Modifications:

~~**HIGH EFFICACY LAMP:** A lamp which has a minimum efficiency of:~~
~~a. 60 lumens per watt for lamps over 40 watts;~~
~~b. 50 lumens per watt for lamps over 15 watts to 40 watts;~~
~~c. 40 lumens per watt for lamps 15 watts or less.~~

(Intervening sections remain as proposed)

505.1 ~~Lighting Controls:~~ ~~Hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles.~~

~~505.2 Interior Lighting Power:~~ ~~A minimum of 75% of all luminaires shall have a high efficacy lamp.~~

~~**EXCEPTION:** Lighting shall comply that complies with the Prescriptive Lighting Option in Section 1520 or the Lighting Power Allowance Option in Section 1530.~~

EXCEPTIONS: 1. Group R-3 and R-4 Occupancies and the dwelling unit portions of Group R-1 and R-2 Occupancies.
2. Lighting exempted by Section 1512.

505.3 Outdoor 505.2 Exterior Lighting: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires.

EXCEPTIONS: 1. Permanently installed outdoor luminaires that are not high efficacy shall be allowed provided they are controlled by a motion sensor(s) with integral photocontrol photosensor.

2. Permanently installed luminaires in or around swimming pools, water features.

505.4 505.3 Linear Fluorescent Fixtures: Linear fluorescent fixtures must be fitted with T-8 or smaller lamps (but not T-10 or T-12 lamps).

(Delete section and defer to language in 139)

EQUATION 1 — GROUP R OCCUPANCY SINGLE-FAMILY RESIDENTIAL
TARGET UA

$$UA_T = SMF \times (U_W A_W + U_{BGW} A_{BGW} + U_{VG} A_{VG} + U_{OG} A_{OG} + U_F A_F + U_{RC} A_{RC} + U_{CC} A_{CC} + U_D A_D + F_S P_S)$$

Where:

UA_T = the target combined thermal transmittance of the gross exterior wall, floor and roof/ceiling assembly area.

SMF = the dwelling unit size mitigation factor:
a. If the gross conditioned floor area of the proposed dwelling unit is less than or equal to 2,500 ft^2, then the SMF = 1.0 (i.e. no adjustment is necessary).
b. If the gross conditioned floor area of the dwelling unit is greater than 2,500 ft^2, then the Target UA is reduced. In this case, SMF = 2500 divided by the gross conditioned floor area of the proposed dwelling unit.

U_W = the thermal transmittance value of the opaque above grade wall area found in Table 5-1.

A_W = opaque above grade wall area.

U_{BGW}= the thermal transmittance value of the below grade opaque wall area found in Table 5-1.

A_{BGW}= opaque below grade wall area.

U_{VG} = the thermal transmittance value of the vertical glazing area found in Table 5-1.

A_{VG} = vertical glazing area (if the proposed total glazing area is equal to or greater than 15% of the total floor area of the conditioned space, the target A_{VG} equals 15% of the total floor area of the conditioned space minus A_{OG}; or, if the proposed total glazing area is less than 15% of the total floor area of the conditioned space, the target A_{VG} equals the proposed A_{VG}.)

U_{OG} = the thermal transmittance value of the overhead glazing area found in Table 5-1.

A_{OG} = overhead glazing area (if the proposed A_{OG} exceeds 15 percent, the target A_{OG} shall be 15 percent of the total floor area of the conditioned space).

U_F = the thermal transmittance value of the floor area found in Table 5-1.

A_F = floor area over unconditioned space.

U_{RC} = the thermal transmittance value of the roof/ceiling area found in Table 5-1.

A_{RC} = roof/ceiling area.

U_{CC} = the thermal transmittance value of the cathedral ceiling area found in Table 5-1.

A_{CC} = cathedral ceiling area.

U_D = the thermal transmittance value of the opaque door area found in Table 5-1.

A_D = opaque door area.

F_S = concrete slab component F-factor found in Table 5-1.

P_S = lineal ft. of concrete slab perimeter.

TABLE 5-1
TARGET COMPONENT VALUES FOR ~~GROUP R OCCUPANCY~~ SINGLE-FAMILY RESIDENTIAL

(Delete table values and defer to those agreed upon in 09-141)

(Intervening sections remain as proposed)

TABLE 6-1
PRESCRIPTIVE REQUIREMENTS[0,1] FOR ~~GROUP R OCCUPANCY~~ SINGLE-FAMILY RESIDENTIAL
CLIMATE ZONE 1

(Delete table values and defer to those agreed upon in 09-141)

(Remainder of proposal not shown; remains as submitted)

Log # 09-102:
Recommend Approval with Modifications:

~~Delete Section 603 in its entirety, and delete Section 503.2 and Chapters 8 and 9.~~

503.2.2 Space Heating and Space Cooling System Sizing Limits: Building mechanical systems for all buildings which provide space heating and/or space cooling shall be sized ~~no greater than 150% of the heating and cooling design loads as calculated above~~ ~~in accordance with ACCA Manual S~~ as required in IRC Section M1401.3.

EXCEPTIONS: The following limited exemptions from the sizing limit shall be allowed; however, in all cases heating and/or cooling design load calculations shall be submitted.

1. For equipment which provides both heating and cooling in one package unit, including heat pumps with electric heating and cooling and gas-pack units with gas heating and electric cooling, compliance need only be demonstrated for ~~either~~ the larger of the space heating or space cooling load for the selected system size.

2. Natural gas- or oil-fired space heating equipment whose total rated space heating output in any one dwelling unit is 40,000 Btu/h or less is exempt from the sizing limit.

~~a.~~ 40,000 Btu/h or less is exempt from the sizing limit.

~~b. larger than 40,000 Btu/h may exceed the 150% sizing limit but not exceed 250% provided that the installed equipment has an annual fuel utilization efficiency (AFUE) of 90% or greater.~~

3. Stand-by equipment may be installed if controls and other devices are provided which allow redundant equipment to operate only when the primary equipment is not operating.

4. Electric resistance heaters under 2 kW.

Log # 09-141:
Recommend Approval with Modifications:

TABLE 5-1
TARGET COMPONENT VALUES ~~FOR GROUP R OCCUPANCY~~

Component	Performance Climate ~~Zone 1 and~~ 2	
	~~1~~1	~~2~~2
Glazing % Floor Area	15%	~~15%~~15%
Vertical Glazing U-Factor ~~All Group R Group R-1 and R-2~~ ~~Group R-3 and R-4~~	U = 0.30 ~~400~~ ~~U = 0.350~~	U = 0.30~~U = 0.32~~ ~~400~~ ~~U = 0.350~~
Overhead Glazing U-Factor	~~U = 0.548~~ U = 0.50	~~U = 0.548~~ U = 0.50
Doors	U = 0.200 ~~(R-5)~~	U – 0.20~~U = 0.200~~ ~~(R-5)~~
Ceilings ~~Attic~~ ~~Single Rafter/Joist Vaulted~~[3]	U = ~~0.026~~0.027 ~~(R-38)~~ ~~U = 0.034~~ ~~(R-30)~~	U = 0.027~~U = 0.031~~ ~~(R-38)~~ ~~U = 0.034~~ ~~(R-30)~~
Walls[1,2]	U = 0.056 ~~(R-21A)~~	U = 0.056~~U = 0.044~~ ~~(R-19A+R-5)~~
Floors	U = 0.029 ~~(R-30)~~	U = 0.029~~U = 0.029~~ ~~(R-30)~~
Slab on Grade ~~Slab R-Value (full slab)~~	F = 0.36 ~~(R-10)~~	F = 0.36~~F = 0.54~~ ~~(R-10)~~
Below Grade ~~Interior~~		
Wall R-Value	R-21	~~R-19~~
2' Depth: Walls Slab~~Slab R-10 Full Slab~~	U = ~~0.044~~0.042 F = ~~0.35~~0.59	~~U = 0.043~~ U = 0.042 ~~F = 0.69~~ F = 0.59
3.5' Depth: Walls Slab~~Slab R-10 Full Slab~~	U = 0.041 F = ~~0.33~~0.64	~~U = 0.041~~ U = 0.041 F = 0.64~~F = 0.64~~
7' Depth: Walls Slab~~Slab R-10 Full Slab~~	U = 0.037 F = ~~0.30~~0.57	~~U = 0.037~~ U = 0.037 F = 0.57~~F = 0.57~~
~~Below Grade Exterior~~		
~~Wall R-Value~~	~~R-10~~	~~R-12~~

2' Depth: Walls Slab	U = 0.070 F = 0.60	U = 0.061 F = 0.60
3.5' Depth: Walls Slab	U = 0.064 F = 0.57	U = 0.057 F = 0.57
7' Depth: Walls Slab	U = 0.056 F = 0.42	U = 0.050 F = 0.42

1. Log and solid timber walls that have a minimum average thickness of 3.5" in spaces with space heating by "other fuels" are exempt from wall target UA and proposed UA calculations.

2. "A" means advanced framing. For more information, see Section 1005.2.

3. Requirement applicable only to single rafter or joist vaulted ceilings where both (a) the distance between the top of the ceiling and the underside of the roof sheathing is less than 12 inches and (b) there is a minimum 1 inch vented airspace above the insulation. Other single rafter or joist vaulted ceilings shall comply with the "ceiling" requirements. This option is limited to 500 square feet of ceiling area for any one dwelling unit.

TABLE 6-1
PRESCRIPTIVE REQUIREMENTS[0,1] FOR GROUP R OCCUPANCY
CLIMATE ZONE 1 AND 2

Option	Glazing Area [1,10]: % of Floor	Glazing U-Factor		Door [9] U-Factor	Ceiling[2]	Vaulted Ceiling[3]	Wall[12] Above Grade	Wall• int[4] Below Grade	Wall• ext[4] Below Grade	Floor[5]	Slab[6] on Grade
		Vertical	Overhead[11]								
I.	10% 12% 13%	0.32 0.35 0.34	0.58 0.50	0.20	R-49 or R-38 std adv	R-30 R-38	R15 R-21 Int[7]	R-15 R-21 TB	R-10 R-15 R-10	R-30	R-10 Full 2'
II.*	15% 25%	00.35 0.30 0.32	0.58 0.50	0.20	R-38 R-38 adv or R-49	R-30 R-38	R-21 R-21 Int[7]	R-21 R-21 TB	R-10 R-15 R-10	R-30	R-10 Full 2'
III.	19% Group R-1 and R-2 Occupancies Only	0.40 0.30	0.58 0.50	0.20	R-38 / U= 0.031 R-38 adv or R-49	R-30 / U= 0.034 R-38	R-21 / U= 0.057 R-21+ R5[8]	R-15 R-21	R-10 R-15	R-30 / U= 0.029	R-10 Full
IV.	26% Unlimited Group R-3 and R-4 Occupancies Only	0.35 0.25	0.58 0.50	0.20	R-38 R-49 adv or R-60	R-30 R-49	R-21 R-21+ R5[8]	R-21 R-21	R-10 R-15	R-30 R-38	R-10 Full
VIII.	Unlimited Group R-1 and R-2 Occupancies Only	0.35 0.22 0.30	0.58 0.50	0.20	R-38 / U= 0.031 R-49 or R-38 adv or R-60	R-30 / U= 0.034 R-49 R-38	R-21 / U= 0.057 R-30 dbl R-21 int[7]	R-15 R-21	R-10 R-15 R-10	R-30 / U= 0.029\ R-38 R-30	R-10 Full 2'

* Reference Case

0. Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 13%, it shall comply with all of the requirements of the 15% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.

2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings complying with note 3. 'Adv' denotes Advanced Framed Ceiling.

3. Requirement applicable only to single rafter or joist vaulted ceilings~~. where both (a) the distance between the top of the ceiling and the underside of the roof sheathing is less than 12 inches and (b) there is a minimum 1-inch vented airspace above the insulation. Other single rafter or joist vaulted ceilings shall comply with the "ceiling" requirements. This option is limited to 500 square feet of ceiling area for any one dwelling unit.~~

4. Below grade walls shall be insulated either on the exterior to a minimum level of R-1~~0~~ 5, continuous or on the interior as a framed wall. ~~to the same level as walls above grade.~~ Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.

5. Floors over crawl spaces or exposed to ambient air conditions.

6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4. Full denotes that all slabs shall be fully insulated to a minimum of R-10. For slabs inside a foundation wall, the insulation shall be installed to provide a thermal break between the slab edge and the foundation.. Monolithic slabs shall include insulation, installed outside the foundation wall and shall extend downward from the top of the slab for a minimum distance of 24 inches or downward and then horizontally for a minimum combined distance of 24 inches. Monolithic slabs shall also include R-10 insulation under the non-load bearing portions of the slab.

7. Int. denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.

8. This wall insulation requirement denotes R-~~19~~ 21wall cavity insulation plus R-5 foam sheathing.

9. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.

10. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U= ~~0.40~~ 0.35 or less is not included in glazing area limitations.

11. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.

12. Log and solid timber walls with a minimum average thickness of 3.5" are exempt from this insulation requirement.

13. dbl denotes a 2 x 4 + 2 x 4: Double Wood Stud wall with a minimum of R-30 insulation.

Log # 09-016:
Tabled with the Following Modifications:

TABLE 10-6B
GROUP R OCCUPANCY:
SMALL BUSINESS COMPLIANCE TABLE FOR VERTICAL GLAZING[1]

DESCRIPTION[2,3,4,6]	FRAME TYPE[7,8]			
	ALUMINUM	ALUM. THERMAL BREAK[9]	WOOD/VINYL	ALUM. CLAD WOOD/REINFORCED VINYL[10]
Double, Clear ¼"	0.82	0.66	0.56	0.59
Double, Clear ¼" + argon	0.77	0.63	0.53	0.56
Double, Low-e0.40, ¼"	0.76	0.61	0.52	0.54
Double, Low-e0.20, ¼"	0.73	0.58	0.49	0.51
Double, Low-e0.10, ¼"	0.70	0.55	0.47	0.49
Double, Low-e0.40, ¼" + argon	0.70	0.55	0.47	0.49
Double, Low-e0.20, ¼" + argon	0.66	0.52	0.43	0.46
Double, Low-e0.10, ¼" + argon	0.64	0.50	0.41	0.43
Double, Clear, 3/8"	0.78	0.63	0.54	0.57
Double, Clear, 3/8" + argon	0.75	0.60	0.51	0.54
Double, Low-e0.40, 3/8"	0.72	0.57	0.48	0.51
Double, Low-e0.20, 3/8"	0.69	0.54	0.45	0.48
Double, Low-e0.10, 3/8"	0.66	0.51	0.43	0.46

Double, Low-e0.40, 3/8" + argon	0.68	0.53	0.44	0.47
Double, Low-e0.20, 3/8" + argon	0.63	0.49	0.41	0.44
Double, Low-e0.10, 3/8" + argon	0.61	0.47	0.35	0.41
Double Low-e0.015, 3/8" + argon	0.61	0.47	0.30	0.41
Double, Clear, ½"	0.75	0.60	0.50	0.54
Double, Clear, ½" + argon	0.72	0.58	0.48	0.51
Double, Low-e0.40, ½"	0.68	0.53	0.44	0.47
Double, Low-e0.20, ½"	0.64	0.50	0.40	0.44
Double, Low-e0.10, ½"	0.61	0.47	0.35[5]	0.42
Double, Low-e0.40, ½" + argon	0.65	0.50	0.42	0.44
Double, Low-e0.20, ½" + argon	0.60	0.46	0.37	0.40
Double, Low-e0.10, ½" + argon	0.58	0.43	0.34	0.38
Double, Low-e0.05, ½" + argon	0.56	0.41	0.30	0.36
Triple, Clear, ¼"	0.66	0.52	0.42	0.44
Triple, Clear, ¼" + argon	0.63	0.49	0.39	0.42
Triple, Low-e0.40, ¼"	0.64	0.50	0.40	0.40
Triple, Low-e0.20, ¼"	0.62	0.48	0.39	0.41
Triple, Low-e0.10, ¼"	0.61	0.47	0.38	0.40
Triple, Low-e0.40, ¼" + argon	0.60	0.46	0.37	0.39
Triple, Low-e0.20, ¼" + argon	0.58	0.43	0.34	0.37
Triple, Low-e0.10, ¼" + argon	0.57	0.42	0.34	0.36
Triple, Clear, ½"	0.61	0.46	0.37	0.40
Triple, Clear, ½" + argon	0.59	0.45	0.36	0.38
Triple, Low-e0.40, ½"	0.58	0.43	0.35	0.37
Triple, Low-e0.20, ½"	0.55	0.41	0.32	0.35
Triple, Low-e0.10, ½"	0.54	0.39	0.31	0.33
Triple, Low-e0.40, ½" + argon	0.55	0.41	0.32	0.35
Triple, Low-e0.20, ½" + argon	0.52	0.38	0.30	0.32
Triple, Low-e0.10, ½" + argon	0.51	0.37	0.29	0.31
Triple, 2 panes coated with Low-e0.20, ½"	0.52	0.35	0.30	0.31
Triple, 2 panes coated with Low-e0.10, ½"	0.50	0.34	0.28	0.29
Triple, 2 panes coated with Low-e0.20, ½" + argon	0.49	0.33	0.28	0.28
Triple, 2 panes coated with Low-e0.10, ½" + argon	0.47	0.30	0.26	0.26

FOOTNOTES TO TABLE 10-6B

1. Subtract 0.02 from the listed default U-factor for non-aluminum spacer. Acceptable spacer materials may include but is not limited to fiberglass, wood and butyl or other material with an equivalent thermal performance.

2. 1/4" = a minimum dead air space of 0.25 inches between the panes of glass.
   3/8" = a minimum dead air space of 0.375 inches between the panes of glass.
   1/2"= a minimum dead air space of 0.5 inches between the panes of glass.
   Product with air spaces different than those listed above shall use the value for the next smaller air space; i.e. 3/4 inch = 1/2 inch U-factors, 7/16 inch = 3/8 inch U-factors, 5/16 inch = 1/4 inch U-factors.

3. Low-e0.40 (emissivity) shall be 0.40 or less.
   Low-e0.20 (emissivity) shall be 0.20 or less.
   Low-e0.10 (emissivity) shall be 0.10 or less.
   Low-e0.05 (emissivity) shall be 0.05 or less.
   Low-e0.015 (emissivity) shall be 0.02 or less.

4. U-factors listed for argon shall consist of sealed, gas-filled insulated units for argon, CO2, SF6, and argon/SF6 mixtures. The following conversion factor shall apply to Krypton gas-filled units: 1/4" or greater with krypton is equivalent to 1/2" argon.
5. For this assembly only, products shall be deemed to comply if they have an emissivity of 0.16 or less.
6. "Glass block" assemblies may use a U-factor of 0.51.
7. Insulated fiberglass framed products shall use wood/vinyl U-factors.
8. Subtract 0.02 from the listed default values for solariums.
9. Aluminum Thermal Break = An aluminum thermal break framed window shall incorporate the following minimum design characteristics:
   a) The thermal conductivity of the thermal break material shall be not more than 3.6 Btu-in/h/ft^2/F°;
   b) The thermal break material must produce a gap in the frame material of not less than 0.210 inches; and,
   c) All metal framing members of the products exposed to interior and exterior air shall incorporate a thermal break meeting the criteria in a) and b) above.
10. Aluminum clad wood windows shall use the U-factors listed for Aluminum Clad Wood/Reinforced Vinyl windows. Vinyl clad wood window shall use the U-factors listed for Wood/Vinyl windows. Any vinyl frame window with metal reinforcement in more than one rail shall use the U-factors listed for Aluminum Clad Wood/Reinforced Vinyl window.

May 1, 2009

Log # 09-051:
Recommend Approval with Modifications:

1513.6 Automatic Shut-Off Controls, Interior: Buildings greater than 5,000 ft^2 and all school classrooms shall be equipped with separate automatic controls to shut off the lighting during unoccupied hours. Within these buildings, all office areas less than 300 ft^2 enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, and warehouse and storage spaces shall be equipped with occupancy sensors that comply with Section 1513.6.1. For other spaces, automatic controls may be an occupancy sensor, time switch or other device capable of automatically shutting off lighting. (For hotel and motel guest rooms, see Section ~~505.1.~~1513.7)

EXCEPTIONS: 1. Areas that must be continuously illuminated (e.g., 24-hour convenience stores), or illuminated in a manner requiring manual operation of the lighting.
2. Emergency lighting systems.
3. Switching for industrial or manufacturing process facilities as may be required for production.
4. Hospitals and laboratory spaces.
5. Areas in which medical or dental tasks are performed are exempt from the occupancy sensor requirement.

~~505.1~~1513.7 **Lighting Controls:** Hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles. In addition, a minimum of one of the following control technologies shall be required in hotel/motel guest rooms with over 50 guest rooms such that all the power to the lights and switched outlets in a hotel or motel guest room would be turned off when the occupant is not in the room and the space temperature would automatically setback (winter) or set up (summer) by no less than 3 C (5 ºF):

1. Controls that are activated by the room occupant via the primary room access method—key, card, deadbolt, etc.
2. Occupancy sensor controls that are activated by the occupant's presence in the room.

1412.4 Setback and Shut-Off: HVAC systems shall be equipped with automatic controls capable of accomplishing a reduction of energy use through control setback or equipment shutdown during periods of non-use or alternate use of the spaces served by the system. The automatic controls shall:

a. Have a minimum seven-day clock and be capable of being set for seven different day types per week,
b. Be capable of retaining programming and time settings during loss of power for a period of at least ten hours, and
c. Include an accessible manual override, or equivalent function (e.g., telephone interface), that allows temporary operation of the system for up to two hours.

EXCEPTIONS: 1. Systems serving areas which require continuous operation at the same temperature setpoint.

2. Equipment with full load demands of 2 kW (6,826 Btu/h) or less may be controlled by readily accessible manual off-hour controls.
3. Systems controlled by an occupant sensor that is capable of shutting the system off when no occupant is sensed for a period of up to 30 minutes.
4. Systems controlled solely by a manually operated timer capable of operating the system for no more than two hours.

For hotel and motel guest rooms, ~~see Section 505.1~~a minimum of one of the following control technologies shall be required in hotels/motels with over 50 guest rooms such that the space temperature would automatically setback (winter) or set up (summer) by no less than 3º C (5º F):when the occupant is not in the room:

1.Controls that are activated by the room occupant via the primary room access method—key, card, deadbolt, etc.

2.Occupancy sensor controls that are activated by the occupant's presence in the room.

Log # 09-064:

Recommend Approval of **Concept** with Modifications: (Values are still under discussion)

1531 Interior Lighting Power Allowance: The interior lighting power allowance shall be calculated by multiplying the gross interior floor area, in square feet, by the appropriate unit lighting power allowance, in watts per square foot, for the use as specified in Table 15-1a or Table 15-1b, only one table may be used for compliance.. Accessory uses, including corridors, lobbies and toilet facilities shall be included with the primary use when using Table 15-1a.

The lighting power allowance for each use shall be separately calculated and summed to obtain the interior lighting power allowance.

In cases where a lighting plan for only a portion of a building is submitted, the interior lighting power allowance shall be based on the gross interior floor area covered by the plan. Plans submitted for common areas only, including corridors, lobbies and toilet facilities shall use the lighting power allowance for common areas in Table 15-1a or Table 15-1b.

~~When insufficient information is known about the specific use of the space, the allowance shall be based on the apparent intended use of the space.~~

TABLE 15-1a
BUILDING AREA METHOD UNIT LIGHTING POWER ALLOWANCE (LPA)

Use[1]	LPA[2] (W/ft^2)	
Automotive facility	~~0.9~~	0.77
Convention center	~~1.2~~	0.99
Courthouse	~~1.2~~	0.95
Cafeterias, fast food establishments[5], restaurants/bars[5]	~~1.3~~	1.03
Dormitory	~~1.0~~	0.63
Dwelling units		1.00
Exercise center	~~1.0~~	0.89
Gymnasia[9], assembly spaces[9]	~~1.0~~	0.86
Health care clinic	~~1.0~~	0.84
Hospital, nursing homes, and other Group I-1 and I-2 Occupancies	~~1.2~~	1.09
Hotel/motel	1.0	
~~Hotel banquet/conference/exhibition hall[3,4]~~	~~2.0~~	
~~Laboratory spaces (all spaces not classified "laboratory" shall meet office and other appropriate categories)~~Laboratory spaces (all spaces not classified "laboratory"…	~~1.8~~	1.62
Laundries	1.2	
Libraries[5]	~~1.3~~	1.10
Manufacturing facility	~~1.3~~	0.97

Museum	~~1.1~~	0.87
Office buildings, office/administrative areas in facilities of other use types (including but not limited to schools, hospitals, institutions, museums, banks, churches)[5,7,11]	~~1.0~~	0.86
Parking garages	0.2	
Penitentiary and other Group I-3 Occupancies	~~1.0~~	0.86
Police and fire stations[8]	~~1.0~~	0.84
Post office	~~1.1~~	1.02
Retail[10], retail banking, mall concourses, wholesale stores (pallet rack shelving)	~~1.5~~	1.33
School buildings (Group E Occupancy only), school classrooms, day care centers	~~1.2~~	0.97
Theater, motion picture	~~1.2~~	0.84
Theater, performing arts	~~1.6~~	1.25
Transportation	~~1.0~~	0.80
Warehouses[11]~~, storage areas~~	~~0.5~~	0.66
Workshop	~~1.4~~	1.2
Plans Submitted for Common Areas Only[7]		
Main floor building lobbies[3] (except mall concourses)	~~1.2~~	1.09
All building common areas, corridors, toilet facilities and washrooms, elevator lobbies, including Group R-1 and R-2 Occupancies	0.8	0.70

TABLE 15-1b
SPACE-BY-SPACE METHOD MAXIMUM ALLOWABLE LIGHTING POWER DENSITY (LPD)

Common Space Types	LPD[2] (w/ft[2])	Building Specific Space Types	LPD[2]

(No change to remainder of proposal; individual values are still under discussion)

Log # 09-130:
Recommend Approval with Modifications:

SECTION 4 — ~~SUGGESTED~~ SOFTWARE FOR SYSTEMS ANALYSIS APPROACH
The simulation program shall be tested according to ANSI/ASHRAE Standard 140 and the results shall be furnished by the software provider.

The following is the list of suggested software, but not limited to:

~~Blast 3.0 (Level 334)~~
~~Blast Support Office~~
~~University of Illinois~~
~~Dept. of Mechanical and Industrial Engineering~~
~~1206 W. Green Street, Room 140, MEB~~
~~Urbana, IL 61801~~
~~(217) 244-8182~~

DOE 2.1E or DOE 2.2 (EQuest)
James J. Hirsch & Associates
Building Performance Analysis
Software & Consulting
12185 Presilla Road
Camarillo, CA 93012-9243
(805) 532-1045

(Software not listed are unchanged)

Log # 09-041:
Recommend Approval with Modifications:

1433 Economizers: Air economizers meeting the requirements of Section 1413 shall be provided on all new systems including those serving computer server rooms, electronic equipment, radio equipment, telephone switchgear.

EXCEPTIONS: 1. Qualifying small equipment: This exception shall not be used for unitary cooling equipment installed outdoors or in a mechanical room adjacent to the outdoors. This exception is allowed to be used for other cooling units and split systems with a total cooling capacity rated in accordance with 1411.2 of less than 33,000 Btu/h (hereafter referred to as qualifying small systems) provided that these are ~~High~~ high-efficiency cooling ~~units~~ equipment with SEER and EER values more than ~~10%~~ 15% higher than minimum efficiencies listed in Tables 14-1A, 14-1B and 14-1D, in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all ~~systems~~ qualifying small equipment without economizers shall not exceed ~~480,000~~ 72,000 Btu/h per building, or ~~20%~~ 5% of its air economizer capacity, whichever is greater. That portion of the equipment serving Group R Occupancy is not included in determining the total capacity of all units without economizers in a building. Redundant units are not counted in the capacity limitations. This exception shall not be used for the shell-and-core permit or for the initial tenant improvement or for RS-29 analysis~~ nor include unitary cooling equipment installed outdoors nor in a mechanical room adjacent to outdoors~~.

2. Chilled water terminal units connected to systems with chilled water generation equipment with ~~COP and~~ IPLV values more than ~~10%~~ ~~40~~ 25% higher than minimum part load efficiencies listed in Table 14-1C, in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all systems without economizers shall not exceed 480,000 Btu/h per building, or 20% of its air economizer capacity, whichever is greater. That portion of the equipment serving Group R Occupancy is not included in determining the total capacity of all units without economizers in a building. This exception shall not be used for the shell-and-core permit or for the initial tenant improvement or for RS-29 analysis.

3. Water-cooled refrigeration equipment serving chilled beams and chilled ceilings space cooling systems only which are provided with a water economizer meeting the requirements of Section 1413. Water economizer capacity per building shall not exceed 500 tons. This exception shall not be used for RS-29 analysis.

4. Systems for which at least 75% of the annual energy used for mechanical cooling is provided from site-recovery or site-solar energy source.

5. Systems where special outside air filtration and treatment, for the reduction and treatment of unusual outdoor contaminants, makes an air economizer infeasible.

6. Systems with dehumidification that affect other systems ~~(such as dehumidification and supermarket refrigeration systems)~~ so as to increase the overall building energy consumption. New humidification equipment shall comply with Section 1413.4.

7. Systems complying with all of the following criteria:

a. Consist of multiple water source heat pumps connected to a common water loop;

b. Have a minimum of 60% air economizer;

c. Have water source heat pumps with an EER at least 15% higher for cooling and a COP at least 15% higher for heating than that specified in Section 1411;

d. Where provided, have a central boiler or furnace efficiency of~~:~~

~~i.~~ 90% minimum ~~for units up to 199,000 Btu/h; and~~

~~ii. 85% minimum for units above 199,000 Btu/h input~~; and

e. Provide heat recovery with a minimum 50% heat recovery effectiveness as defined in Section 1436 to preheat the outside air supply.

8. For Group R Occupancy, cooling units installed outdoors or in a mechanical room adjacent to outdoors with a total cooling capacity less than 20,000 Btu/h and other cooling units with a total cooling capacity less than 54,000 Btu/h provided that these are high-efficiency cooling equipment with SEER and EER values more than 15% higher than minimum efficiencies listed in Tables 14-1A, 14-1B and 14-1D, in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. For split-systems, compliance is based on the cooling capacity of individual fan coil units.

9. Equipment used to cool any dedicated server room, electronic equipment room or telecom switch room provided that they completely comply with option a, ~~or~~ option b or option c ~~or option d~~ in the table below. The total capacity of all systems without economizers shall not exceed 240,000 Btu/h per building or 10% of its air economizer capacity, whichever is greater. This exception shall not be used for RS-29 analysis

	Equipment type	Higher equipment efficiency	Part-load control	Economizer
Option 9a	Table 14-1A and Table 14-1Ba	+ 15%b	Required over 85,000 Btu/hc	None required
Option 9b	Table 14-1A and Table 14-1Ba	+ 5%d	Required over 85,000 Btu/hc	Waterside economizere
~~Option 9c~~	~~Table 14-1C, Table 14-1K, Table 14-1L, and Table 14-1Mf~~	~~+ 5%/10%g~~	~~Required for all chillersh~~	~~Waterside economizere~~
Option ~~9d~~ 9c	ASHRAE Standard ~~127i~~127f	+ 0%~~jg~~	Required over 85,000 Btu/hc	Waterside economizere

Notes to Exception 9.

a. For a system where all of cooling equipment is subject to the ARI standards listed in Table 14-1A and Table 14-1B, the system shall comply with all of the following (note that if the system contains any cooling equipment that exceeds the capacity limits in Table 14-1A or Table 14-1B, or if the system contains any cooling equipment that is not included in Table 14-1A or Table 14-1B, then system is not allowed to use this option).

b. The cooling equipment shall have an EER value and an IPLV value that is a minimum of 15% greater than the value listed in Table 14-1A and Table 14-1B (1.15 x values in Tables 14-1A and 14-1B).

c. For units with a total cooling capacity over 85,000 Btuh, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50% of the load or less that results in the compressor operating at the same or higher EER at part loads than at full load (e.g. minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, dual tandem scrolls, but hot gas bypass is not credited as a compressor unloading system).

d. The cooling equipment shall have an EER value and an IPLV value that is a minimum of 5% greater than the value listed in Table 14-1A and Table 14-1B (1.05 x values in Tables 14-1A and 14-1B).

e. The system shall include a water economizer in lieu of air economizer. Water economizers shall be capable of providing the total concurrent cooling load served by the connected terminal equipment lacking airside economizer, at outside air temperatures of 50°F dry-bulb/45°F wet-bulb and below. For this calculation, all factors including solar and internal load shall be the same as those used for peak load calculations, except for the outside temperatures. The equipment shall be served by a dedicated condenser water system unless a non-dedicated condenser water system exists that can provide appropriate water temperatures during hours when waterside economizer cooling is available.

~~f. For a system with chillers subject to the ARI standards listed in Table 14-1C, Table 14-1K, Table 14-1L, and Table 14-1M (e.g. a chilled water system with fan coil units).~~

~~g. For air-cooled chillers, the cooling equipment shall have an IPLV value that is a minimum of 5% greater than the IPLV value listed in Table 14-1C (1.05 x values in Table 14-1C). For water-cooled chillers, the cooling equipment shall have an IPLV or NPLV value that is a minimum of 10% greater than the IPLV or NPLV value listed in Table 14-1C, Table 14-1K, Table 14-1L, and Table 14-1M (1.10 x values in Table 14-1C, Table 14-1K, Table 14-1L, and Table 14-1M).~~

~~h. The chiller shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50% of the load or less that results in the compressor operating at the same or higher EER at part loads than at full load (e.g. minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, dual tandem scrolls, but hot gas bypass is not credited as a compressor unloading system).~~

~~i~~f. For a system where all of cooling equipment is subject to ASHRAE Standard 127-2007.

~~j~~g. The cooling equipment subject to the ASHRAE Standard 127-2007 shall have an EER value and an IPLV value that is equal or greater than the value listed in Table 14-1A and Table 14-1B when determined in accordance with the rating conditions ASHRAE Standard 127-2007 (i.e. not the rating conditions in ARI Standard 210/240 or 340/360). This information shall be provided by an independent third party.

(Remainder of proposal not shown; remains as submitted)

Log # 09-043:
Recommend Approval with Modifications:

1436 Heat Recovery

1436.1 Fan Systems: Fan systems which

~~a.~~ have ~~both (1)~~ a minimum outdoor air capacity of 5,000 cfm or greater ~~or serve a space with a design heating or cooling load exceeding 150 Btu/h-ft^2 and ((which have)) (2) a minimum outside air supply of 70% or greater of the total air circulation, or~~

~~b. have both (1) a capacity of 10,000 cfm or greater and (2) a minimum outside air supply of 50% or greater of the total air circulation, or~~

~~c. have both (1) a capacity of 20,000 cfm or greater and (2) a minimum outside air supply of 30% or greater of the total air circulation,~~

shall have a heat recovery system with at least 50% recovery effectiveness. Fifty percent heat recovery effectiveness shall mean an increase in the outside air supply temperature at design heating conditions of one-half the difference between the outdoor design air temperature and 65°F. Provisions shall be made to bypass or control the heat recovery system to permit air economizer operation as required by Section 1433. Heat recovery may be provided from any site-recovered or site-solar source. Where a single room or space is supplied by multiple units, the aggregate ventilation (cfm) of those units shall be used in applying this requirement.

EXCEPTIONS: These exceptions only apply to the particular exhaust subsystems. The remaining cfm of the main supply system is subject to the energy recovery requirements.

1. Laboratory systems equipped with both variable air volume supply and variable air volume or two-speed exhaust fume hoods provided that an instruction label is placed on the face of the hood that provides the information in Exhibit 14-1.

Exhibit 14-1

INSTRUCTIONS TO OPERATOR
To be in compliance with the energy code, this fume hood is designed to operate as variable air volume (vav) by adjusting the sash or controller. Maintain sash in the minimum position during use and close totally when the fume hood is not in use.

2. Systems serving spaces heated to less than 60°F.
3. Systems which can be shown to use as much energy with the addition of heat recovery equipment as without it.
4. Systems exhausting toxic, flammable, paint exhaust or corrosive fumes making the installation of heat recovery equipment impractical.
5. Type I commercial kitchen hoods.
6. Systems that only provide cooling.
7. Cooling only air handling units or air conditioning units where the minimum outdoor air is less than 70% of total supply air.

1436.2 Condensate Systems: On-site steam heating systems shall have condensate water recovery. On-site includes a system that is located within or adjacent to one or more buildings within the boundary of a contiguous area or campus under one ownership and which serves one or more of those buildings.

~~Other buildings~~ Buildings using steam generated off-site with steam heating systems which do not have condensate water recovery shall have condensate heat recovery.

1436.3 Heat Recovery for Service Water Heating: Condenser water heat recovery systems shall be installed for heating or preheating of service hot water provided all of the following are true:

a. The facility operates 24 hours a day.

b. The total installed heat rejection capacity of the water-cooled systems exceeds ~~6,000,000~~ 1,500,000 Btu/h of heat rejection.

c. The capacity of service water heating equipment exceeds ~~1,000,000~~ 250,000 Btu/h.

The required heat recovery system shall have the capacity to provide the smaller of:

a. 60% of the peak heat rejection load at design conditions, or

b. preheat of the peak service hot water draw to 85°F , or

c. 50% of the service water heating load.

EXCEPTIONS:

1. Facilities that employ condenser heat recovery for space heating with a heat recovery design exceeding 30% of the peak water-cooled condenser load at design conditions.

2. Facilities that provide 60% of their service water heating from site solar or site recovered energy or from other sources.

~~**1436.4 Condenser Heat Recovery.** Supermarkets having a gross conditioned floor area of 50,000 ft^2 or greater shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, and either for space heating or for dehumidification reheat for maintaining low space humidity.~~

1436.4 Condenser Heat Recovery. Facilities having food service, meat or deli departments and having 500,000 Btu/h or greater of remote refrigeration condensers shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, space heating or for dehumidification reheat. Facilities having a gross conditioned floor area of 40,000 ft^2 or greater and 1,000,000 Btu/h or greater of remote refrigeration shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, and either for space heating or for dehumidification reheat for maintaining low space humidity.

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9. Variable Refrigerant Flow (VRF) systems, multiple-zone split-system heat pumps, consisting of multiple, individually metered indoor units with multi-speed fan motors, served on a single common refrigeration circuit with an exterior reverse-cycle heat-pump with variable-speed compressor(s) and variable speed condenser fan(s). These systems shall also be capable of providing simultaneous heating and cooling operation, where recovered energy from the indoor units operating in one mode can be transferred to one or more indoor units operating in the other mode, and shall serve at least 20% internal (no perimeter wall within 12') and 20% perimeter zones (as determined by conditioned floor area) and the outdoor unit shall be at least 65,000 Btu/h in total capacity. ~~Systems installed under this exception shall not count against total capacity limits for non-economizer equipped systems under this code.~~ Systems utilizing this exception shall have 50% heat recovery effectiveness on the outside air. For the purposes of this exception dedicated server rooms, electronic equipment rooms or telecom switch rooms are not considered perimeter zones. This exception shall be limited to buildings of 60,000 square feet and less.

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1314.7 Continuous Air Barrier. For buildings over five stories, the building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of, the conditioned space. All air barrier components of each envelope assembly shall be clearly identified on construction documents and the joints, interconnections and penetrations of the air barrier components shall be detailed.

1314.7.1 Characteristics. The continuous air barrier shall have the following characteristics:

(a) The air barrier component of each assembly shall be joined and sealed in a flexible manner to the air barrier component of adjacent assemblies, allowing for the relative movement of these assemblies and components. This requirement shall not be construed to restrict the materials or methods by which the air barrier is achieved.

(b) It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the air barrier without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.

(c) It shall be installed in accordance with the manufacturer's instructions and in such a manner as to achieve the performance requirements.

1314.7.2 Compliance. Compliance of the continuous air barrier for the opaque building envelope shall be demonstrated by testing the completed building and demonstrating that the air leakage rate of the building envelope does not exceed 0.40 cfm/ft^2 at a pressure differential of 0.3" w.g. (1.57 psf)) as specified below.

a. Whole building testing shall be accomplished in accordance with ASTM E 779 or approved similar test. Tests shall be accomplished using either pressurization or depressurization or both. The building shall not be tested unless it is verified that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner. Following are comments referring to ASTM E 779:

b. Under ASTM E 779 it is permissible to test using the building's HVAC system. In buildings with multistory HVAC systems and shafts it is permissible to test using the building's mechanical system using CAN/CGSB-149.15-96 Determination of the Overall Envelope Airtightness of Buildings by the Fan Pressurization Method Using the Building's Air Handling Systems, Canadian General Standards Board, Ottawa.

c. In lieu of the fan pressurization method described in ASTM E779, a tracer gas test of the building air change rate in accordance with ASTM E 741 is also allowed. The tracer gas test shall be run with building HVAC fans off.

d. Section 8.1 – For purposes of this test, a multi-zone building shall be configured as a single zone by opening all interior doors, and otherwise connecting the interior spaces as much as possible. It is also allowed to test a smaller section of the building, provided the test area can be isolated from neighboring conditioned zones by balancing the pressure in adjacent conditioned zones to that in the zone being tested. This can be very difficult to do in buildings with multistory shafts and HVAC systems. If a smaller section of the building is tested, provide a drawing showing the zone(s) tested, the pressure boundaries and a diagram of the testing equipment configuration.

e. Section 8.2 – Seal all intentional functional openings such as exhaust and relief louvers, grilles and dryer vents, that are not used in the test to introduce air, using plastic sheeting and duct tape or similar materials. All plumbing traps shall be filled with water.

f. Section 8.10 – The test pressure range shall be from 10 Pa to 80 Pa. If approved by the Building Official, lower test pressures are acceptable, but the upper limit shall not be less than 50 Pa.

g. Section 9.4 –If both pressurization and depressurization are not tested, plot the air leakage against the corrected ΔP for either pressurization or depressurization.

h. Section 9.6.4 –If the pressure exponent n is less than 0.5 or greater than 1, corrective work shall be performed to the continuous air barrier and the test shall be rerun.

i. Section 10.4 – Report the air leakage rate normalized in cfm/ft^2 at 0.3" w.g. (1.57 psf) over the total area of the building envelope air pressure boundary including the lowest floor, any below-grade walls, above-grade walls, and roof (or ceiling) (including windows and skylights) separating the interior conditioned space from the unconditioned environment.

1314.7.3 Certificate of Occupancy. ~~Neither a temporary certificate of occupancy nor a~~ A final certificate of occupancy shall not be issued for the building, or portion thereof, until such time that the building official determines the building, or portion thereof, ~~passes the~~ has been field ~~testing~~tested in accordance with Section 1314.7.2.

1131 Additions to Existing Buildings: Additions to existing buildings or structures may be constructed without making the entire building or structure comply, provided that the new additions shall conform to the provisions of this Code.

EXCEPTION: New additions which do not fully comply with the requirements of this Code and which have a floor area which is less than 750 ft^2 may be approved provided that improvements are made to the existing building to compensate for any deficiencies in the new addition. Compliance shall be demonstrated by either systems analysis per Section 1141.4 or component performance calculations per Sections 1330 through 1334. The nonconforming addition and upgraded existing building shall have an energy budget or target UA and SHGC that are less than or equal to the unimproved existing building, with the addition designed to comply with this Code. These additions are also exempt from Section 1314.7.

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101.2 Purpose and Intent: The purpose of this Code is to provide minimum standards for new or altered buildings and structures or portions thereof to achieve efficient use and conservation of energy.

The purpose of this Code is not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this Code.

It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques to achieve efficient use and conservation of energy. These provisions are structured to permit compliance with the intent of this Code by any one of the following three paths of design:

1. A systems analysis approach for the entire building and its energy-using sub-systems which may utilize renewable energy sources; Chapter 4 and Chapter 9.
2. A component performance approach for various building elements and mechanical systems and components; Chapter 5 and Chapter 9.
3. A prescriptive requirements approach; Chapter 6 and Chapter 9.

~~4. In addition, the design shall comply with the additional energy efficiency requirements of Chapter 9~~

Compliance with any one of these approaches meets the intent of this Code. This Code is not intended to abridge any safety or health requirements required under any other applicable codes or ordinances.

The provisions of this Code do not consider the efficiency of various energy forms as they are delivered to the building envelope. A determination of delivered energy efficiencies in conjunction with this Code will provide the most efficient use of available energy in new building construction.

101.3 Scope: This Code sets forth minimum requirements for the design of new buildings and structures that provide facilities or shelter for residential occupancies by regulating their exterior envelopes and the selection of their HVAC, service water heating systems, and equipment for efficient use and conservation of energy.

Buildings shall be designed to comply with the requirements of either Chapter 4, 5 or 6 of this Code~~.~~ and the additional energy efficiency requirements included in Chapter 9 of this Code.

401.1 General: This chapter establishes design criteria in terms of total energy use by a building, including all of its systems. Analysis of design for all Group R Occupancies shall comply with Section 402.1 through 402.6. In addition, the design shall comply with the additional energy efficiency requirements of Chapter 9.

402.2 Energy Analysis: Compliance with this chapter will require an analysis of the annual energy usage, hereinafter called an annual energy analysis.

EXCEPTION: Chapters 5 and 6 of this Code establish criteria for different energy-consuming and enclosure elements of the building which will eliminate the requirement for an annual systems energy analysis while meeting the intent of this Code.

A building designed in accordance with this chapter will be deemed as complying with this Code if the calculated annual energy consumption is not greater than the Building Floor Area Adjusted Annual Energy Target listed in Table 9-A compared to a similar building (defined as a "standard design") whose enclosure elements and energy-consuming systems are designed in accordance with Chapter 5.

501.1 General: Buildings that are heated or mechanically cooled shall be constructed so as to provide the required thermal performance of the various components. A building that is designed to be both heated and cooled shall meet the more stringent of the heating or cooling requirements as provided in this Code when requirements of the exterior envelope differ. In addition, the design shall comply with the additional energy efficiency requirements of Chapter 9.

502.2.1 UA Calculations: The proposed UA as calculated using Equations 2 and 3 shall not exceed the target UA as calculated using Equation 1, For the purpose of determining equivalent thermal performance, the glazing area for the target UA shall be calculated using values in Table 5-1. The opaque door area shall be the same in the target UA and the proposed UA. When showing compliance with Table 9-1 using options ~~3, 4 or 5~~4, 5 or 6, the proposed design shall be less than the target UA by the fraction noted in the table.

EXCEPTION: Log and solid timber walls that have a minimum average thickness of 3.5" and with space heat type other than electric resistance, are exempt from wall target UA and proposed UA calculations.

601.1 General: This chapter establishes design criteria in terms of prescribed requirements for building construction.

The provisions of this chapter are applicable to all Group R Occupancies. Occupancies shall comply with all the requirements of Chapter 5 except for the modifications herein specified. In addition, the design shall comply with the additional energy efficiency requirements of Chapter 9.

For wood frame assemblies, the building envelope requirements of this chapter may be met by installing one of the prescriptive packages in Table 6-1 or 6-2. Installed components shall meet the requirements of Section 602. Compliance with nominal R-values shall be demonstrated for the thermal resistance of the added insulation in framing cavities and/or insulated sheathing only and shall not include the thermal transmittance of other building materials or air films, but shall permit interruption by occasional framing members. Other than wood frame assemblies with continuous insulation uninterrupted by framing shall also be allowed to comply with nominal R-values.

For metal assemblies, compliance shall be demonstrated in accordance with Chapter 4 or Chapter 5 based on the assemblies in Chapter 10. Compliance with nominal R-values is not allowed, unless the full nominal R-value of the insulation is installed either inside or outside of the framing and is uninterrupted by framing.

EXCEPTION: Group R-1 and R-2 occupancy buildings may use a maximum area weighted average U-factor for components not exceeding those prescribed in Paths III and V in Table 6-1 or Paths IV and VI in Table 6-2.

CHAPTER 9
~~RESERVED~~
ADDITIONAL RESIDENTIAL ENERGY EFFICIENCY REQUIREMENTS

901 Additional Residential Energy Efficiency Requirements. Dwelling units permitted under this chapter shall comply with all provision of Chapter 5 of this code and develop ~~3~~ 2 credits from Table 9~~.~~ 1. ~~Negative credits shall be assessed in accordance with Table 9-1 if housing unit dwelling size exceeds 3500 square feet of heated floor area. These debits shall be made up by credits drawn from other options in table 9-1. Compliance based on table 6-1 Options 1, 3, 4, 5, 6, may not use Options 3, 4, or 5, in this table to comply with the provisions of this chapter. All other option would be applicable.~~

Exception~~s~~:

1. Buildings complying using Chapter 4 Building Design by Systems Analysis shall meet this provision of this section by demonstrating that the proposed building energy use is 16 percent less ~~lower~~ than the target building energy use ~~by the fraction noted in Table 9-A, Building Floor Area Adjusted Annual Energy Target. Energy target may be reduced by 3% for each KW of on-site renewable generating capacity (photovoltaic, wind)~~

~~**Table 9-A, Building Floor Area Adjusted Annual Energy Target**~~

~~Square Feet of Floor Area~~	~~<1200~~	~~1200 to 1499~~	~~1500 to 3499~~	~~3500 to 4499~~	~~>4499~~
~~Proposed site energy / Target site energy~~	~~1.06~~	~~1.11~~	~~1.16~~	~~1.23~~	~~1.30~~

Table 9.1 Energy Credits (Debits)

Option	**DESCRIPTION**	**CREDIT(S)**

1a	HIGH EFFICIENCY HVAC EQUIPMENT 1: ~~1.1~~ Gas, propane or oil-fired furnace or boiler with minimum AFUE of 92%, or ~~1.2~~ Air-source heat pump with minimum HSPF of 8.5~~,~~ ~~or~~ ~~1.3 Closed-loop ground source heat pump with minimum COP of 3.0~~	1.0
1b	HIGH EFFICIENCY HVAC EQUIPMENT 2: Closed-loop ground source heat pump; with a minimum COP of 3.3	2.0
1c	HIGH EFFICIENCY HVAC EQUIPMENT 3: DUCTLESS SPLIT SYSTEM HEAT PUMPS, ZONAL CONTROL: In home where the primary space heating system is zonal electric heating, a ductless heat pump system shall be installed and provide heating to at least one zone of the housing unit.	1.0
2	HIGH EFFICIENCY HVAC DISTRIBUITON SYSTEM:[1] All heating and cooling system components installed inside the conditioned space. All combustion equipment shall be direct vent or sealed combustion. Locating system components in conditioned crawl spaces is not permitted under this option. Electric Resistance Heat is not permitted under this option. Direct Combustion Heating Equipment with AFUE less than ~~82~~80% is not permitted under this option.	~~0.5~~1.0
3a	EFFICIENT BUILDING ENVELOPE 1~~.~~: ~~This option~~ Prescriptive compliance is based on ~~option 2 table 6.1~~ Table 6-1, Option III with the following modifications: window U=.28 ~~and wall R-21 + R-2.5~~floor R-38, slab on grade R-10 full, below grade slab R-10 full. ~~No added credits for the other prescriptive paths in this option.~~ **or** Component performance compliance: Reduce the Target UA from Table 5~~.~~-1 by 5%, as determined using EQUATION 1. [1]	0.5
~~4~~3b	EFFICIENT BUILDING ENVELOPE 2~~.~~: ~~This option~~Prescriptive compliance is based on ~~option 2 table 6.1~~ Table 6-1, Option III with the following modifications: window U=.25 and wall R-21 plus R-4 and R-38 floor, slab on grade R-10 full, below grade slab R-10 full, and R-21 plus R-5 below grade basement walls. ~~No added credits for the other prescriptive paths in this option.~~ **or** Component performance compliance: Reduce the Target UA from Table 5.1 by 15%, as determined using EQUATION 1. [1]	1.0
~~5~~3c	SUPER-EFFICIENT BUILDING ENVELOPE 3~~.~~: ~~This option is based on option 2 table 6.1~~Prescriptive compliance is based on Table 6-1, Option III with the following modifications: window U=.22 and wall R-21 plus R-12 and R-38 floor, slab on grade R-10 full, below grade slab R-10 full and R-21 plus R-12 below grade basement walls and R-49 advanced ceiling and vault. ~~No added credits for the other prescriptive paths in this option.~~ **or** Component performance compliance: Reduce the Target UA from Table 5.1 by 30%, as determined using EQUATION 1. [1]	2.0
~~6~~4a	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION: Envelope leakage reduced to SLA of 0.000~~20~~15 Building envelope tightness shall be considered acceptable when tested air leakage is less than Specific Leakage Area of 0.000~~20~~15 when tested with a blower door at a pressure difference of 50 PA. Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and combustion appliances. **and** All Whole House ventilation requirements as determined by Section 302 or Section 303 of the Washington State Ventilation and indoor air quality Code shall be met with	~~1.0~~0.5

	a heat recovery ventilation system in accordance with Section 304.4.4 of that code.	
4b	ADDITIONAL AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION: Envelope leakage reduced to SLA of 0.00015 Building envelope tightness shall be considered acceptable when tested air leakage is less than Specific Leakage Area of 0.00015 when tested with a blower door at a pressure difference of 50 PA. Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and combustion appliances. **and** All Whole House ventilation requirements as determined by Section 302 or Section 303 of the Washington State Ventilation and indoor air quality Code shall be met with a heat recovery ventilation system in accordance with Section 304.4.4 of that code.	1.0
75a	EFFICIENT WATER HEATING. [1] Water heating system shall include one of the following: 7.1 Gas, propane or oil water heater with a minimum EF of 0.62 or 7.2 Electric Water Heater with a minimum EF of .93 **and for both cases** All showerhead and kitchen sink faucets installed in the house shall meet be rated at 1.75 GPM or less, All other lavatory faucets shall be rated at 1.0 GPM or less.[2]	0.5
85b	HIGH EFFICIENCY WATER HEATING. [1] Water heating system shall include one of the following: 8.1 Gas, propane or oil water heater with a minimum EF of 0.82 or 8.2 Solar water heating supplementing a minimum standard water heater. Solar water heating will provide a rated minimum savings of 85 therms or 2000 kWh based on the Solar Rating and Certification Corporation (SRCC) Annual Performance of OG-300 Certified Solar Water Heating Systems or 8.3 Electric Heat Pump Water Heater with a minimum EF of 2.0.	1.5
9	DUCTLESS SPLIT SYSTEM HEAT PUMPS, ZONAL CONTROL: In home where the primary space heating system is zonal electric heating, a ductless heat pump system shall be installed and provide heating to at least one zone of the housing unit.	1.0
106	SMALL HOUSING DWELLING UNIT 1: [1] Housing Dwelling units less than 1500 square feet in floor area with less than 300 square feet of window + door area. Additions to existing building that are less than 750 square feet of heated floor area.	1.0
11	SMALL HOUSING UNIT 2: [1] Housing units less than 1200 square feet in floor area with less than 300 square feet of window + door area. Additions to existing building that are less than 250 square feet of heated floor area.	2.0
127	LARGE HOUSING DWELLING UNIT 1[1] Housing Dwelling units exceeding 35000 square feet of floor area shall be assessed a deduction for purposes of complying with Section 901 of this code.	-1.0
13	LARGE HOUSING UNIT 2[1] Housing units exceeding 4500 square feet of floor area shall be assessed a deduction for purposes of complying with section 901 of this code.	-2.0
148	RENEWABLE ELECTRIC ENERGY: For each 1200 kWh of electrical generation provided annually by on site wind or solar equipment a 0.5 credit shall be allowed, up to 3 credits. Generation shall be calculated as follows: 14.1 For solar electric systems, the design shall be demonstrated to meet this requirement using the National Renewable Energy Laboratory calculator PVWATTs, Documentation noting solar access shall be included on the plans.	0.5

	~~14.2~~ For wind generation projects designs shall document annual power generation based on the following factors. The wind turbine power curve; average annual wind speed at the site; frequency distribution of the wind speed at the site and height of the tower.	

Footnote

1. Interior Duct Placement: Ducts included as Option 2 of table 9-1 shall be placed wholly within the heated envelope of the housing unit. The placement shall be inspected and certified to receive the credits associated with this option.

Exception: Ducts complying with this section may have up to 5% of the total linear feet of ducts located in the exterior cavities or buffer spaces of the dwelling. If this exception is used the ducts will be tested to the following standards:

Post-construction test: Leakage to outdoors shall be less than or equal to 1 CFM per 100 ft^2 of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Plumbing Fixtures Flow Ratings. Low flow plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following requirements:

(a) Residential bathroom lavatory sink faucets: Maximum flow rate – 3.8 L/min (1.0 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.

(b) Residential kitchen faucets: Maximum flow rate – 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.

(c) Residential showerheads: Maximum flow rate – 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.

May 22, 2009

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TABLE 13-1
BUILDING ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 1

(underlining left out of table for readability)

	Nonresidential		Residential, Other than Single-Family	
Opaque Elements	**Assembly Max.**	**Insulation Min. R-Value**	**Assembly Max.**	**Insulation Min. R-Value**
Roofs				
Insulation Entirely above Deck	U-0.034	R-30 c.i.	U-0.031	R-38 c.i.
Metal Building	U-0.031	R-25 + R-11 Ls	U-0.031	R-25 + R-11 Ls
Single-Rafter	U-0.027~~0~~	R-38 ~~+ R-10 c.i.~~.	U-0.027~~0~~	R-38 ~~+ R-10 c.i.~~
Attic and Other	U-0.~~017~~027	R-~~60~~38 adv or R-49	U-0.~~017~~027	R-~~60~~38 adv or R-49
Walls, Above-grade				
Mass	U-0.~~060~~090	R-~~15~~ 10 c.i.	U-0.057	R-16 c.i.
Metal Building	U-0.~~052~~064	R-13 + R-~~13~~ 7.5 c.i.	U-0.~~038~~057	R-19 + R-~~19.5~~8.5 c.i.
Steel Framed	U-0.~~055~~064	R-13 + R-~~10~~ 7.5c.i.~~, or R-21 + R-9 c.i.~~	U-0.~~037~~057	R-~~13~~ 19 + R-~~18.8~~8.5 c.i.~~, or R-21 + R-17.9 c.i.~~
Wood Framed and Other	U-0.~~051~~057	~~R-13 + R-7.5 c.i., or~~ R-21 ~~+ R-2.5 c.i.~~	U-0.~~036~~057	R-13 + R-~~15.6~~ 6 c.i., or R-21~~+ R-10 c.i.~~
Wall, Below Grade				
Below Grade Wall		Same as above grade		Same as above grade
Floors				
Mass	U-0.029	R-30 c.i.	U-0.029	R-30 c.i.
Steel Joist	U-0.029	R-38 + R-4 c.i.	U-0.029	R-38 + R-4 c.i.
Wood Framed and Other	U-0.~~026~~029	R-30 ~~+ R-7.5 c.i.~~	U-0.~~026~~029	R-30 ~~+ R-7.5 c.i.~~

Slab-On-Grade Floors				
Unheated	F-0.~~520~~540	R-~~15~~ 10 for 24 in. (with thermal break)~~, or R-10 for 48 in.~~	F-0.~~520~~540	R-~~15~~ 10 for 24 in. (with thermal break)~~, or R-10 for 48 in.~~
Heated	F-0.~~440~~360	~~R-15 for 36 in. +~~ R-~~5~~ 10 c.i.~~ below~~(with thermal break)	F-0.~~440~~360	~~R-15 for 36 in. +~~ R-~~5~~ 10 c.i.~~ below~~ (with thermal break)
Opaque Doors				
Swinging	U-0.~~400~~600		U-0.400	
Non-Swinging	U-0.~~400~~600		U-0.400	
Fenestration *0-40% of Wall*	**Assembly Max. U**	**Assembly Max. SHGC**	**Assembly Max. U**	**Assembly Max. SHGC**
Vertical Fenestration		**(see 1323.4 & 1323.5)**		**(see 1323.4 & 1323.5)**
Nonmetal framing: all[b] Metal framing: fixed~~[c]~~/operable ~~Metal framing: operable[c]~~ Entrance doors	U-0.~~28~~32 U-0.~~35~~40 U-0.~~45~~60	SHGC-0.~~25~~ 40 all, OR SHGC-0.~~35~~ 45 all PLUS permanent PF > 0.50 on west, south, and east	U-0.~~28~~32 U-0.~~35~~40 U-0.~~45~~60	~~SHGC-0.30 all, OR SHGC-0.40 all PLUS permanent PF > 0.50 on west, south, and east~~
Skylights				
Without curb (i.e. sloped glazing)	U-0.~~45~~50	SHGC-0.35 all	U-0.~~45~~50	SHGC-0.35 all
With curb (i.e individual unit skylights)	U-0.60		U-0.60	

The following definitions apply: c.i. = continuous insulation, Ls = liner system (see definitions)

TABLE 13-2
BUILDING ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 2
(underlining left out of table for readability)

	Nonresidential		**Residential, Other than Single-Family**	
Opaque Elements	**Assembly Max.**	**Insulation Min. R-Value**	**Assembly Max.**	**Insulation Min. R-Value**
Roofs				
Insulation Entirely above Deck	U-0.~~032~~034	R-30.~~0~~ c.i.	U-0.031	R-38.~~0~~ c.i.
Metal Building	U-0.031	R-25 + R-11 Ls	U-0.031	R-25 + R-11 Ls
Single-Rafter	U-0.027~~0~~	R-38.~~0 + R-10 c.i.~~	U-0.027~~0~~	R-38.~~0 + R-10 c.i.~~
Attic and Other	U-0.~~017~~027	R-~~60~~38 adv or R-49	U-0.~~017~~027	R-~~60~~38 adv or R-49
Walls, Above-grade				
Mass	U-0.~~051~~080	R-~~18~~ 13.3 c.i.	U-0.044	R-21 c.i.
Metal Building	U-0.~~047~~064	R-~~19~~ 13 + R-~~15~~ 7.5 c.i.	U-0.~~038~~044	~~R-19 + R-19.5 c.i.~~ R-19 + R-16 ci
Steel Framed	U-0.~~046~~064	R-13 + R-~~14~~ 7.5 c.i.~~, or R-21 + R-12.5 c.i.~~	U-0.~~037~~044	~~R-13 + R-18.8 c.i., or R-21 + R-17.9 c.i.~~R-19 + R-14 Ci
Wood Framed and Other	U-0.~~045~~051	R-13 + R-~~10~~ 7.5 c.i., or R-21 + R-2.5 c.i., or R-25	U-0.~~036~~044	~~R-13 + R-15.6 c.i., or~~ R-21 + R-~~10~~ 5 c.i.
Wall, Below Grade				
Below Grade Wall		Same as above grade		Same as above grade
Floors				
Mass	U-0.029	R-30 c.i.	U-0.029	R-30 c.i.
Steel Joist	U-0.029~~3~~	R-38.~~0~~ + R-~~12.5~~ 4 c.i.	U-0.029~~3~~	R-38.0 + R-~~12.5~~ 4 c.i.
Wood Framed and Other	U-0.029~~2~~	R-30.~~0 + R-15~~ c.i.~~, or R-49~~	U-0.029~~2~~	R-30.~~0 + R-15~~ c.i.~~, or R-49~~
Slab-On-Grade Floors				
Unheated	F-0.~~520~~540	R-1~~5~~ for 24 in. (with thermal break)~~, or~~	F-0.~~510~~540	R-~~2~~10 for 24 in. (with thermal break)

		~~R-10 for 48 in~~.		
Heated	F-0.~~440~~360	~~R-15.0 for 36 in. + R-5~~ 10 c.i. ~~below~~(with thermal break)	F-0.~~440~~360	~~R-15.0 for 36 in. + R-5~~ 10 c.i. ~~below~~(with thermal break)
Opaque Doors				
Swinging	U-0.~~400~~600		U-0.400	
Non-Swinging	U-0.~~400~~600		U-0.400	
Fenestration *0-40% of Wall*	**Assembly Max. U**	**Assembly Max. SHGC**	**Assembly Max. U**	**Assembly Max. SHGC**
Vertical Fenestration		(see 1323.4 & 1323.5)		(see 1323.4 & 1323.5)
Nonmetal framing: all[b] Metal framing: fixed/operable[e] ~~Metal framing: operable[e]~~ Metal framing, entrance door	U-0.~~28~~32 U-0.~~35~~40 ~~U-0.45~~ U-0.60	SHGC-0.~~25~~ 40 all, OR SHGC-0.~~35~~ 45 all PLUS permanent PF > 0.50 on west, south, and east	U-0.~~28~~32 U-0.~~35~~40 ~~U-0.45~~ U-0.60	~~SHGC-0.30 all, OR~~ ~~SHGC-0.40 all PLUS permanent PF > 0.50 on west, south, and east~~
Skylights				
Without curb (i.e. sloped glazing)	U-0.~~45~~50	SHGC-0.35 all	U-0.~~45~~50	SHGC-0.35 all
With curb (i.e individual unit skylights)	U-0.60		U-0.60	

The following definitions apply: c.i. = continuous insulation, Ls = liner system (see definitions)

Add/Modify the following definitions in Chapter 2:

~~**BELOW-GRADE WALLS:** Walls or the portion of walls which are entirely below the finished grade or which extend two feet or less above the finished grade.~~

CONTINUOUS INSULATION (ci): Insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.

DOOR: All operable opening areas, which are not glazing, in the building envelope including swinging and roll-up doors, fire doors, smoke vents and access hatches.

DOOR AREA: Total area of door measured using the rough opening and including the door and frame.

FENESTRATION: all areas (including the frames) in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, doors that are more than one-half glass, and glass block walls. (See *building envelope* and *door*.)

SKYLIGHT: a fenestration surface having a slope of less than 60 degrees from the horizontal plane. Other fenestration, even if mounted on the roof of a building, is considered *vertical fenestration*.

VERTICAL FENESTRATION: all fenestration other than skylights. Trombe wall assemblies, where glazing is installed within 12 in. of a mass wall, are considered walls, not fenestration. For the purposes of determining building envelope requirements, the vertical fenestration classifications are defined as follows:

METAL FRAMING: products with metal framing with or without thermal break.

METAL FRAMING, ENTRANCE DOOR: any doorway, set of doors, turnstile, vestibule, or other form of portal that is ordinarily used to gain access by its users and occupants to the building or to individual tenant spaces accessed from the exterior. (See also *building entrance door*.)

METAL FRAMING, FIXED: all *vertical fenestration*, other than *entrance door* and *operable*, including, but not limited to, curtain walls, window walls, fixed windows, picture windows, glass block walls, non-openable clerestory windows, and non-openable sidelites and transoms.

METAL FRAMING, OPERABLE: all *vertical fenestration* that opens, except *entrance doors*, including, but not limited to, casement windows, projecting windows, pivoting windows, horizontal sliding windows, vertical sliding windows, openable clerestory windows, openable sidelites and transoms, sliding glass doors, and doors that are not *entrance doors*.

NONMETAL FRAMING: all products with framing materials other than metal with or without metal reinforcing or cladding.

FLOOR, ENVELOPE: that lower portion of the building envelope, including opaque area and fenestration, that has conditioned or semiheated space above and is horizontal or tilted at an angle of less than 60 degrees from horizontal but excluding slab-on-grade floors. For the purposes of determining building envelope requirements, the classifications are defined as follows:

MASS FLOOR: a floor with a heat capacity that exceeds (1) 7 Btu/ft^2·°F or (2) 5 Btu/ft^2·°F provided that the floor has a material unit mass not greater than 120 lb/ft^3.

STEEL-JOIST FLOOR: a floor that (1) is not a mass floor and (2) that has steel joist members supported by structural members.

WOOD-FRAMED AND OTHER FLOORS: all other floor types, including wood joist floors.

(See *building envelope*, *fenestration*, *opaque area*, and *slab-on-grade floor*).

GLAZING: All areas, including the frames, in the shell of a conditioned space that let in natural light including windows, clerestories, skylights, sliding or swinging glass doors and glass block walls.

GLAZING AREA: Total area of the glazing measured using the rough opening, and including the glazing, sash and frame. For doors where the daylight opening area is less than 50 percent of the door area, the glazing area is the daylight opening area. For all other doors, the glazing area is the door area.

INSULATION POSITION:

a. **Exterior Insulation Position:** a wall having all or nearly all of its mass exposed to the room air with the insulation on the exterior of the mass.

b. **Integral Insulation Position:** a wall having mass exposed to both room and outside air, with substantially equal amounts of mass on the inside and outside of the insulation layer.

c. **Interior Insulation Position:** a wall not meeting either of the above definitions; particularly a wall having most of its mass external to the insulation layer.

LINER SYSTEM (Ls): A continuous membrane is installed below the purlins and uninterrupted by framing members. Uncompressed, unfaced insulation rests on top of the membrane between the purlins. For multilayer installations, the last *rated R-value of insulation* is for unfaced insulation draped over purlins and then compressed when the metal roof panels are attached. A minimum R-3 (R-0.5) thermal spacer block between the purlins and the metal roof panels is required, unless compliance is shown by the overall assembly U-factor.

OVERHEAD GLAZING: A glazing surface that has a slope of less than 60° from the horizontal plane.

RADIANT SLAB FLOOR: A slab floor assembly on grade or below, containing heated pipes, ducts, or electric heating cables that constitute a floor or portion thereof for complete or partial heating of the structure.

ROOF*:* the upper portion of the building envelope, including opaque areas and fenestration, that is horizontal or tilted at an angle of less than 60° from horizontal. For the purposes of determining building envelope requirements, the classifications are defined as follows:

ATTIC AND OTHER ROOFS: all other roofs, including roofs with insulation entirely below (inside of) the roof structure (i.e., attics, cathedral ceilings, and single-rafter ceilings), roofs with insulation both above and below the roof structure, and roofs without insulation but excluding metal building roofs.

METAL BUILDING ROOF: a roof that is:

1. constructed with a metal, structural, weathering surface,
2. has no ventilated cavity, and
3. has the insulation entirely below deck (i.e., does not include composite concrete and metal deck construction nor a roof framing system that is separated from the superstructure by a wood substrate) and whose structure consists of one or more of the following configurations:

a. metal roofing in direct contact with the steel framing members
b. insulation between the metal roofing and the steel framing members
c. insulated metal roofing panels installed as described in 1 or 2

ROOF WITH INSULATION ENTIRELY ABOVE DECK: a roof with all insulation

1. installed above (outside of) the roof structure and
2. continuous (i.e., uninterrupted by framing members).

SKYLIGHT: (See ~~**Overhead Glazing**~~**Fenestration**.)

SLAB-ON-GRADE, EXTERIOR: Any portion of a slab floor in contact with the ground which is less than or equal to 24 inches below the final elevation of the nearest exterior grade.

SLAB-BELOW-GRADE: Any portion of a slab floor in contact with the ground which is more than 24 inches below the final elevation of the nearest exterior grade.

VERTICAL GLAZING: A glazing surface that has a slope of 60° or greater from the horizontal plane.

WALL: that portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater. This includes above- and below-grade walls, between floor spandrels, peripheral edges of floors, and foundation walls. For the purposes of determining building envelope requirements, the classifications are defined as follows:

ABOVE-GRADE WALL: a wall that is not a below-grade wall.

BELOW-GRADE WALL: that portion of a wall in the building envelope that is entirely below the finish grade and in contact with the ground.

MASS WALL: a wall with an *HC* exceeding (1) 7 Btu/ft^2·°F or (2) 5 Btu/ft^2·°F, provided that the wall has a material unit weight not greater than 120 lb/ft^3.

METAL BUILDING WALL: a wall whose structure consists of metal spanning members supported by steel structural members (i.e., does not include spandrel glass or metal panels in curtain wall systems).

STEEL-FRAMED WALL: a wall with a cavity (insulated or otherwise) whose exterior surfaces are separated by steel framing members (i.e., typical steel stud walls and curtain wall systems).

WOOD-FRAMED AND OTHER WALLS: all other wall types, including wood stud walls.

WALLS (EXTERIOR): Any member or group of members which defines the exterior boundaries or courts of a building and which have a slope of 60° or greater from the horizontal plane, and separates conditioned from unconditioned space. Band joists between floors are to be considered a part of exterior walls.

(Portions of proposal not shown remain as submitted)

Log # 09-144:
Recommend Approval with Modifications:

1411.1 General: Equipment shall have a minimum performance at the specified rating conditions not less than the values shown in Tables 14-1A through 14-1G. If a nationally recognized certification program exists for a product covered in Tables 14-1A through 14-1G, and it includes provisions for verification and challenge of equipment efficiency ratings, then the product shall be listed in the certification program.

Gas-fired and oil-fired forced air furnaces with input ratings ≥ 225,000 Btu/h (65 kW) and all unit heaters shall also have an intermittent ignition or interrupted device (IID), and have either mechanical draft (including power venting) or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings ≥ 225,000 Btu/h (65 kW), including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75% of the input rating.

Chilled water plants and buildings with more than ~~300~~ 500 tons total ~~water cooled~~ capacity shall not have more than 100 tons provided by air-cooled chillers.

EXCEPTIONS: 1. Where the designer demonstrates that the water quality at the building site fails to meet manufacturer's specifications for the use of water-cooled equipment.

2. Air-cooled chillers with minimum efficiencies ~~equal to or greater than approved water-cooled equipment~~at least 10% higher than those listed in Table 14-1C.

3. Replacement of existing equipment.

ADD FOOTNOTE TO TABLE 14-1C TO Air Cooled With Condenser, Electrically Operated and Air Cooled Without Condenser, Electrically Operated.

[C] - Chilled water plants and buildings with more than ~~300~~ 500 tons total capacity shall not have more than 100 tons provided by air-cooled chillers

May 29, 2009

Log # 09-106/098/099:
Recommend Approval with Modifications:

501.2 Application. The *commercial building* project shall comply with the requirements in Sections 502 (Buildings envelope requirements), 503 (Building mechanical systems), 504 (Service water heating), ~~and~~ 505 (Electrical power and lighting systems), and 507 (Energy consuming mechanisms) in its entirety.

1550 (507) ENERGY CONSUMING MECHANISMS (Mandatory)

1551(507.1) General (Mandatory). This section establishes criteria for the control of energy consuming mechanisms other than those covered under Section 505 that serve commercial buildings.

1552 (507.1.1) Pedestrian escalators and moving pedestrian walkways. Each pedestrian escalator or moving pedestrian walkway shall be equipped with an automatic control device to prevent ~~idle~~ operation of escalators and moving walkways when the mechanisms are unoccupied.

Log # 09-101:
Recommend Submitting to ICC with Modifications:

505.2.2.2 Automatic lighting shutoff. Buildings larger than 5,000 square feet (465m^2) shall be equipped with an automatic control device to shut off lighting in those areas. This automatic control device shall function on either:

1. A scheduled basis, using time-of-day, with an independent program schedule that controls the interior lighting in areas that do not exceed 25,000 square feet (2323m^2) and are not more than one floor; or

2. An occupant sensor that shall turn lighting off within 30 minutes of an occupant leaving a space. ~~Occupant sensors in Group B occupancies shall be programmable or allow for an override switch to reduce the connected lighting load by at least 50 percent during nonbusiness hours to allow custodial duties to be performed~~; or

3. A signal from another control or alarm system that indicates the area is occupied. ~~The signal, control or alarm in Group B occupancies shall be programmable or allow for an override switch to reduce the connected lighting load by at least 50 percent during nonbusiness hours to allow custodial duties to be performed~~

4. Automatic time switches shall have a minimum 7 day clock and be capable of being set for 7 different day types per week and incorporate an automatic holiday "shut-off" feature, which turns off all loads for at least 24 hours and then resumes normally scheduled operations. Automatic time switches shall also have program back-up capabilities, which prevent the loss of program and time settings for at least 10 hours, if power is interrupted.

Automatic time switches shall incorporate an over-ride switching device which:

a. is readily accessible;

b. is located so that a person using the device can see the lights or the areas controlled by the switch, or so that the area being illuminated is annunciated;

c. is manually operated;

d. allows the lighting to remain on for no more than 2 hours when an over-ride is initiated; and

e. controls an area not exceeding 5,000 ft^2 or 5% of the building footprint for footprints over 100,000 ft^2, whichever is greater.

Log # 09-129:
Recommend Approval with Modifications:

(June 25, the percentage above code in G1.2 was changed to 5%; footnote 1 was added to the baseline description table shown in Section G3.1.2)

(Portions of ASHRAE 90.1-2007 Appendix G not shown were not modified)

WASHINGTON STATE ENERGY CODE, REFERENCE STANDARD 29 (RS-29)

~~*Notes:*~~ **G1. GENERAL**

~~G1.3~~ G1.1 ~~**Performance Rating Method Scope.** This building performance rating method is a modification of the Energy Cost Budget (ECB) Method in Section 11 and is intended for use in rating the energy *efficiency* of building designs that exceed the requirements of this standard. This appendix does NOT offer an alternative compliance path for minimum standard compliance; that is the intent of Section 11, Energy Cost Budget Method. Rather, this appendix is provided for those wishing to use the methodology developed for this standard to quantify performance that substantially exceeds the requirements of Standard 90.1. It may be useful for evaluating the performance of all *proposed designs*, including *alterations* and *additions* to *existing buildings*, except designs with no mechanical systems~~. This Standard establishes design criteria in terms of total energy consumption of a building, including all of its systems. General principles and requirements are outlined in Section 2. Specific modeling assumptions are listed in Section 3. The building permit application for projects utilizing this Standard shall include in one submittal all building and mechanical drawings and all information necessary to verify that the design for the project corresponds with the annual energy analysis. If credit is proposed to be taken for lighting energy savings, then electrical drawings shall also be included with the building permit application.
Due to the various assumptions that are necessary, the results of the analysis shall not be construed as a guarantee of the actual energy performance of the project.

G1.2 **Performance Rating.** This performance rating method requires conformance with the following provisions:
All requirements of Sections ~~5.4, 6.4, 7.4, 8.4, 9.4, and 10.4~~ 1310, 1314, 1410-1416, 1440, 1443, 1510-1514, and 1540 are met.These sections contain the mandatory provisions of the standard and are prerequisites for this rating method. The improved performance of the proposed building design is calculated in accordance with provisions of this appendix using the following formula: Percentage improvement

= 100 × (*Baseline building performance*

– Proposed building performance) / *Baseline building performance*

A "proposed building" designed in accordance with this standard will be deemed as complying with this code, if the calculated annual energy consumption is ~~10~~5% LESS than that of a corresponding "baseline building".

Notes:

~~3.~~1. Both the *proposed building performance* and the *baseline building performance* shall include all end-use load components, such as receptacle and process loads.

~~b.~~2. Neither the *proposed building performance* nor the *baseline building performance* are predictions of actual energy consumption or costs for the *proposed design* after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

~~G2.1~~ G1.3 **Trade-Off Limits.** When the proposed modifications apply to less than the whole building, only parameters related to the systems to be modified shall be allowed to vary. Parameters relating to unmodified existing conditions or to future building components shall be identical for determining both the *baseline building performance* and the *proposed building performance*. Future building components shall meet the ~~prescriptive~~ requirements of ~~Sections 5.5, 6.5, 7.5, 9.5, and 9.6~~Chapter 11 of the code.

~~G2.2.4~~ G1.4 **Documentation Requirements.** Simulated performance shall be documented, and documentation shall be submitted to the ~~*rating authority*~~*building official*. The information submitted shall include the following:

~~2.~~a. Calculated values for the *baseline building performance*, the *proposed building performance*, and the percentage improvement.

~~**Exceptions:**~~b. A list of the energy-related features that are included in the design and on which the performance rating is based. This list shall document all energy features that differ between the models used in the *baseline building performance* and *proposed building performance* calculations.

~~d.~~c. Input and output report(s) from the *simulation program* or compliance software including a breakdown of energy usage by at least the following components: lights, internal equipment loads, service water heating equipment, space heating equipment, space cooling and heat rejection equipment, fans, and other HVAC equipment (such as pumps). The output reports shall also show the amount of time any loads are not met by the HVAC system for both the *proposed design* and *baseline building design*.

d. An explanation of any error messages noted in the *simulation program* output.

G2. SIMULATION GENERAL REQUIREMENTS

~~G2.5~~ G2.1 **Performance Calculations.** The *proposed building performance* and *baseline building performance* shall be calculated using the following:

a. the same *simulation program*

b. the same weather data

~~c. the same energy rates~~Note: "Performance" is defined as "energy consumption".

G2.2.4 The simulation program shall be tested according to ASHRAE Standard 140~~, and the results shall be furnished by the software provider~~.

~~c.~~**G2.4 Design~~Energy Rates~~.** ~~Annual energy costs shall be determined using either actual rates for purchased energy or state average energy prices published by DOE's Energy Information Administration (EIA) for commercial building customers, but rates from different sources may not be mixed in the same project.~~The standard design and the proposed design shall be designed on a common basis as specified herein:

The comparison shall be expressed as kBtu input per square foot of conditioned floor area per year at the building site. Buildings which use electricity as the only fuel source, comparisons may be expressed in kWh. When converting electricity in kWh to kBtu a multiplier of 3.413 kWh/kBtu shall be used.

If the proposed design results in an increase in consumption of one energy source and a decrease in another energy source, even though similar sources are used for similar purposes, the difference in each energy source shall be converted to equivalent energy units for purposes of comparing the total energy used

~~**Note:** The above provision allows users to gain credit for features that yield load management benefits. Where such features are not present, users can simply use state average unit prices from EIA, which are updated annually and readily available on EIA's Web site (www.eia.doe.gov).~~

~~*Note:*~~ **Exception:** ~~-~~On-site renewable energy sources or site-recovered energy shall not be considered to be ~~purchased~~ consumed energy and shall not be included in the *proposed building performance*. Where on-site renewable or site-recovered sources are used, the *baseline building performance* shall be based on the energy source used as the backup energy source or on the use of electricity if no backup energy source has been specified.

G2.5 Exceptional Calculation Methods. Where no simulation program is available that adequately models a design, material, or device, the ~~*rating authority*~~*building official* may approve an exceptional calculation method to demonstrate above-standard

performance using this method. Applications for approval of an exceptional method shall include documentation of the calculations performed and theoretical and/or empirical information supporting the accuracy of the method.

G3. CALCULATION OF THE PROPOSED AND BASELINE BUILDING PERFORMANCE

G3.1.1.1 Purchased Heat. For systems using purchased hot water or steam~~, hot water or steam costs shall be based on actual utility rates, and~~ on-site boilers shall not be modeled in the *baseline building design*.

Modeling Requirements for Calculating Proposed and Baseline Building Performance

No.	Proposed Building Performance	Baseline Building Performance
1. Design Model		
a.	The simulation model of the *proposed design* shall be consistent with the design documents, including proper accounting of fenestration and opaque envelope types and areas; interior lighting power and controls; HVAC system types, sizes, and controls; and service water heating systems and controls. All end-use load components within and associated with the building shall be modeled, including, but not limited to, exhaust fans, parking garage ventilation fans, snow-melt and freeze-protection equipment, facade lighting, swimming pool heaters and pumps, elevators and escalators, refrigeration, and cooking. Where the simulation program does not specifically model the functionality of the installed system, spreadsheets or other documentation of the assumptions shall be used to generate the power demand and operating schedule of the systems.	The *baseline building design* shall be modeled with the same number of floors and identical conditioned floor area as the *proposed design*.
b.	All conditioned spaces in the *proposed design* shall be simulated as being both heated and cooled even if no heating or cooling system is to be installed, and temperature and humidity control setpoints and schedules shall be the same for *proposed* and *baseline building designs*.	
c.	When the *performance rating method* is applied to buildings in which energy-related features have not yet been designed (e.g., a lighting system), those yet-to-be-designed features shall be described in the *proposed design* exactly as they are defined in the *baseline building design*. Where the space classification for a space is not known, the space shall be categorized as an office space.	
2. Additions and Alterations		
	It is acceptable to predict performance using building models that exclude parts of the *existing building* provided that all of the following conditions are met:	Same as Proposed Design
a.	Work to be performed in excluded parts of the building shall meet the requirements of ~~Sections 5 through 10~~Chapters 10 through 15.	
b.	Excluded parts of the building are served by HVAC systems that are entirely separate from those serving parts of the building that are included in the building model.	
c.	Design space temperature and HVAC system operating setpoints and schedules on either side of the boundary between included and excluded parts of the building are essentially the same.	
d.	If a declining block or similar utility rate is being used in the analysis and the excluded and included parts of the building are on the same utility meter, the rate shall reflect the utility block or rate for the building plus the *addition.*	
3. Space Use Classification		
	Usage shall be specified using the building type or space type lighting classifications in accordance with ~~Section 9.5.1 or 9.6.1~~Chapter 15. The user shall specify the space use classifications using either the building type or space type categories but shall not combine the two types of categories. More than one building type category may be used in a building if it is a mixed-use facility. If space type categories are used, the user may simplify the placement of the various space types within the building model, provided that building-total areas for each space type are accurate.	Same as Proposed Design
4. Schedules		

Schedules capable of modeling hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation shall be used. The schedules shall be typical of the proposed building type as determined by the designer and approved by the ~~*rating authority*~~*building official*. HVAC Fan Schedules. Schedules for HVAC fans that provide outdoor air for ventilation shall run continuously whenever spaces are occupied and shall be cycled on and off to meet heating and cooling loads during unoccupied hours. Exceptions: a. Where no heating and/or cooling system is to be installed and a heating or cooling system is being simulated only to meet the requirements described in this table, heating and/or cooling system fans shall not be simulated as running continuously during occupied hours but shall be cycled on and off to meet heating and cooling loads during all hours. b. HVAC fans shall remain on during occupied and unoccupied hours in spaces that have health and safety mandated minimum ventilation requirements during unoccupied hours.	Same as Proposed Design Exception: Schedules may be allowed to differ between *proposed design* and *baseline building design* when necessary to model nonstandard *efficiency* measures, provided that the revised schedules have the approval of the ~~rating authority~~building official. Measures that may warrant use of different schedules include, but are not limited to, lighting controls, natural ventilation, demand control ventilation, and measures that reduce service water heating loads.
5. Building Envelope	
All components of the *building envelope* in the *proposed design* shall be modeled as shown on architectural drawings or as built for existing building envelopes. Exceptions: The following building elements are permitted to differ from architectural drawings. a. All uninsulated assemblies (e.g., projecting balconies, perimeter edges of intermediate floor stabs, concrete floor beams over parking garages, roof parapet) shall be separately modeled using either of the following techniques: 1. Separate model of each of these assemblies within the energy simulation model. 2. Separate calculation of the U-factor for each of these assemblies. The U-factors of these assemblies are then averaged with larger adjacent surfaces using an area-weighted average method. This average U-factor is modeled within the energy simulation model. Any other envelope assembly that covers less than 5% of the total area of that assembly type (e.g., exterior walls) need not be separately described provided that it is similar to an assembly being modeled. If not separately described, the area of an envelope assembly shall be added to the area of an assembly of that same type with the same orientation and thermal properties. b. Exterior surfaces whose azimuth orientation and tilt differ by less than 45 degrees and are otherwise the same may be described as either a single surface or by using multipliers. c. For exterior roofs, the roof surface may be modeled with a reflectance of 0.45 if the reflectance of the *proposed design* roof is greater than 0.70 and its emittance is greater than 0.75 or has a minimum SRI of 82. Reflectance values shall be based on testing in accordance with ASTM C1549, ASTM E903, or ASTM E1918, and emittance values shall be based on testing in accordance with ASTM C1371 or ASTM E408, and SRI shall be based on ASTM E1980 calculated at medium wind speed. All other roof surfaces shall be modeled with a reflectance of 0.30. d. Manual fenestration shading devices such as blinds or shades shall not be modeled. Automatically controlled fenestration shades or blinds may be modeled. Permanent shading devices such as fins, overhangs, and light shelves may be modeled.	Equivalent dimensions shall be assumed for each exterior envelope component type as in the *proposed design*; i.e., the total gross area of exterior walls shall be the same in the *proposed* and *baseline building designs*. The same shall be true for the areas of roofs, floors, and doors, and the exposed perimeters of concrete slabs on grade shall also be the same in the *proposed* and *baseline building designs*. The following additional requirements shall apply to the modeling of the *baseline building design*: a. **Orientation.** The *baseline building performance* shall be generated by simulating the building with its actual orientation and again after rotating the entire building 90, 180, and 270 degrees, then averaging the results. The building shall be modeled so that it does not shade itself. b. **Opaque Assemblies.** Opaque assemblies used for new buildings or *additions* shall conform with the following common, lightweight assembly types and shall match the appropriate assembly maximum U-factors in Tables ~~5.5-1 through 5.5-8~~13-1 and 13-2: • Roofs—Insulation entirely above deck • Above-grade walls—Steel-framed • Floors—Steel-joist • Opaque door types shall match the proposed design and conform to the U-factor requirements from the same tables. • Slab-on-grade floors shall match the F-factor for unheated slabs from the same tables. Opaque assemblies used for *alterations* shall conform with Sections ~~5.1.3~~1130 through 1134. c. **Vertical Fenestration.** Vertical fenestration areas for new buildings and *additions* shall equal that in the *proposed design* or 40% of gross above-grade wall area, whichever is smaller, and shall be distributed on each face of the building in the same proportions in the *proposed design*. Fenestration U-factors and SHGC shall match the appropriate requirements in Tables ~~5.5-1 through 5.5-8~~13-1 and13-2. ~~Fenestration SHGC shall match the appropriate requirements in Tables 5.5-1 through 5.5-8.~~ All vertical glazing shall be assumed to be flush with the exterior wall, and no shading projections shall be modeled. Manual window shading devices such as blinds or shades shall not be modeled. The fenestration areas for envelope *alterations* shall reflect the limitations on area, U-factor, and SHGC as described in ~~Section 5.1.3~~Chapter 11. d. **Skylights and Glazed Smoke Vents.** Skylight area shall be equal to that in the proposed building design or 5% of the gross roof area that is part of the *building envelope*, whichever is smaller. If the skylight area of the proposed building design is greater than 5% of the gross roof area, baseline skylight area shall be decreased by an identical percentage in all roof components in which skylights are located to reach the 5% skylight-to-roof ratio. Skylight orientation and tilt shall be the same as in the proposed building design. Skylight U-factor and SHGC properties shall match the appropriate requirements in Tables ~~5.5-1 through 5.5-8~~13-1 and 13-2. e. **Roof albedo.** All roof surfaces shall be modeled with a reflectivity of 0.30. f. **Existing Buildings.** For existing *building envelopes*, the *baseline building design* shall reflect existing conditions prior to any revisions that are part of the scope of work being evaluated.
6. Lighting	

Lighting power in the *proposed design* shall be determined as follows: ~~G3.1.2.1~~ ~~a.~~Where a complete lighting system exists, the actual lighting power for each thermal block shall be used in the model. ~~G3.1.2.5~~ ~~b.~~Where a lighting system has been designed, lighting power shall be determined in accordance with ~~Sections 9.1.3 and 9.1.4~~Chapter 15. ~~G3.1.2.6~~ ~~c.~~Where lighting neither exists nor is specified, lighting power shall be determined in accordance with the Building Area Method for the appropriate building type. ~~G3.1.2.9~~ ~~d.~~Lighting system power shall include all lighting system components shown or provided for on the plans (including lamps and ballasts and task and furniture-mounted fixtures). Exception: For multifamily *dwelling units*, hotel/motel guest rooms, and other spaces in which lighting systems are connected via receptacles and are not shown or provided for on building plans, assume identical lighting power for the *proposed* and *baseline building designs* in the simulations. e. Lighting power for parking garages and building facades shall be modeled. ~~1.~~f. Credit may be taken for the use of automatic controls for daylight utilization but only if their operation is either modeled directly in the building simulation or modeled in the building simulation through schedule adjustments determined by a separate daylighting analysis approved by the ~~*rating authority*~~*building official*. ~~1.~~g. For automatic lighting controls in addition to those required for minimum code compliance under ~~Section 9.4.1~~Chapter 15, credit may be taken for automatically controlled systems by reducing the connected lighting power by the applicable percentages listed in Table G3.2. Alternatively, credit may be taken for these devices by modifying the lighting schedules used for the *proposed design*, provided that credible technical documentation for the modifications are provided to the ~~*rating authority*~~*building official*.	Lighting power in the *baseline building design* shall be determined using the same categorization procedure ~~(building area or space function)~~ and categories as the *proposed design* with lighting power set equal to the maximum allowed for the corresponding method and category in ~~Section 9.2~~Chapter 15. ~~No~~ Aautomatic lighting controls (e.g., programmable controls or automatic controls for daylight utilization) shall be modeled in the *baseline building design*~~, as the lighting schedules used are understood to reflect the mandatory control requirements in this standard~~ as required in Chapter 15.
7. Thermal Blocks—HVAC Zones Designed	
Where HVAC zones are defined on HVAC design drawings, each HVAC zone shall be modeled as a separate *thermal block*. Exception: Different HVAC zones may be combined to create a single *thermal block* or identical *thermal blocks* to which multipliers are applied, provided that all of the following conditions are met: a. The space use classification is the same throughout the *thermal block*. b. All HVAC zones in the *thermal block* that are adjacent to glazed exterior walls face the same orientation or their orientations vary by less than 45 degrees. c. All of the zones are served by the same HVAC system or by the same kind of HVAC system.	Same as Proposed Design.
8. Thermal Blocks—HVAC Zones Not Designed	
Where the HVAC zones and systems have not yet been designed, *thermal blocks* shall be defined based on similar internal load densities, occupancy, lighting, thermal and space temperature schedules, and in combination with the following guidelines: a. Separate *thermal blocks* shall be assumed for interior and perimeter spaces. Interior spaces shall be those located greater than 15 ft from an exterior wall. Perimeter spaces shall be those located within 15 ft of an exterior wall. b. Separate *thermal blocks* shall be assumed for spaces adjacent to glazed exterior walls; a separate zone shall be provided for each orientation, except that orientations that differ by less than 45 degrees may be considered to be the same orientation. Each zone shall include all floor area that is 15 ft or less from a glazed perimeter wall, except that floor area within 15 ft of glazed perimeter walls having more than one orientation shall be divided proportionately between zones. c. Separate *thermal blocks* shall be assumed for spaces having floors that are in contact with the ground or exposed to ambient conditions from zones that do not share these features. d. Separate *thermal blocks* shall be assumed for spaces having exterior ceiling or roof assemblies from zones that do not share these features.	Same as Proposed Design.

9. Thermal Blocks—Multifamily Residential Buildings	
Residential spaces shall be modeled using at least one *thermal block* per *dwelling unit*, except that those units facing the same orientations may be combined into one *thermal block*. Corner units and units with roof or floor loads shall only be combined with units sharing these features.	Same as Proposed Design.
10. HVAC Systems	
The HVAC system type and all related performance parameters in the *proposed design*, such as equipment capacities and efficiencies, shall be determined as follows: a. Where a complete HVAC system exists, the model shall reflect the actual system type using actual component capacities and efficiencies. ~~G3.1.2.5~~ b. Where an HVAC system has been designed, the HVAC model shall be consistent with design documents. Mechanical equipment efficiencies shall be adjusted from actual design conditions to the standard rating conditions specified in ~~Section 6.4.1~~Chapter 14 if required by the simulation model. ~~G3.1.2.6~~ c. Where no heating system exists or no heating system has been specified, the heating system classification shall be assumed to be electric, and the system characteristics shall be identical to the system modeled in the *baseline building design*. ~~G3.1.2.9~~ d. Where no cooling system exists or no cooling system has been specified, the cooling system shall be identical to the system modeled in the *baseline building design*.	The HVAC system(s) in the *baseline building design* shall be of the type and description specified in Section G3.1.1, shall meet the general HVAC system requirements specified in Section G3.1.2, and shall meet any system-specific requirements in Section G3.1.3 that are applicable to the baseline HVAC system type(s).
11. Service Hot-Water Systems	
The service hot-water system type and all related performance parameters, such as equipment capacities and efficiencies, in the *proposed design* shall be determined as follows: a. Where a complete service hot-water system exists, the *proposed design* shall reflect the actual system type using actual component capacities and efficiencies. b. Where a service hot-water system has been specified, the service hot-water model shall be consistent with design documents. c. Where no service hot-water system exists or has been specified but the building will have service hot-water loads, a service hot-water system shall be modeled that matches the system in the *baseline building design* and serves the same hot-water loads. d. For buildings that will have no service hot-water loads, no service hot-water system shall be modeled.	The service hot-water system in the *baseline building design* shall use the same energy source as the corresponding system in the *proposed design* and shall conform with the following conditions: ~~G3.1.2.1~~ a. Where the complete service hot-water system exists, the *baseline building design* shall reflect the actual system type using the actual component capacities and efficiencies. ~~G3.1.2.5~~ b. Where a new service hot-water system has been specified, the system shall be sized ~~according to the provisions of Section 7.4.1~~using the same methods and values as the proposed design and the equipment shall match the minimum *efficiency* requirements in ~~Section 7.4.2~~Chapter 14. Where the energy source is electricity, the heating method shall be electrical resistance. ~~G3.1.2.6~~ c. Where no service hot-water system exists or has been specified but the building will have service hot-water loads, a service water system(s) using electrical-resistance heat and matching minimum *efficiency* requirements of ~~Section 7.4.2~~Chapter 14 shall be assumed and modeled identically in the *proposed* and *baseline building designs*. ~~G3.1.2.9~~ d. For buildings that will have no service hot-water loads, no service hot-water heating shall be modeled. ~~G3.1.2.10~~ e. Where a combined system has been specified to meet both space heating and service water heating loads, the baseline building system shall use separate systems meeting the minimum *efficiency* requirements applicable to each system individually. ~~2.~~f. For large, 24-hour-per-day facilities that meet the prescriptive criteria for use of condenser heat recovery systems described in ~~Section 6.5.6.2~~Chapter 14, a system meeting the requirements of that section shall be included in the *baseline building design* regardless of the exceptions ~~to Section 6.5.6.2~~in Chapter 14. **Exception:** If a condenser heat recovery system meeting the requirements described in ~~Section 6.5.6.2~~Chapter 14 cannot be modeled, the requirement for including such a system in the actual building shall be met as a prescriptive requirement in accordance with ~~Section 6.5.6.2~~Chapter 14, and no heat-recovery system shall be included in the *proposed* or *baseline building designs*. ~~2.~~g. Service hot-water energy consumption shall be calculated explicitly based upon the volume of service hot water required and the entering makeup water and the leaving service hot-water temperatures. Entering water temperatures shall be estimated based upon the location. Leaving temperatures shall be based upon the end-use requirements. ~~1)~~h. Where recirculation pumps are used to ensure prompt availability of service hot water at the end use, the energy consumption of such pumps shall be calculated explicitly. ~~1)~~i. Service water loads and usage shall be the same for both the *baseline building design* and the *proposed design* and shall be documented by the calculation procedures ~~described in Section 7.2.1~~recommended by the manufacturer's specifications or generally accepted engineering methods.

	Exceptions: 1. Appliances that are not built-in (e.g. washing machines) and plumbing fixtures (e.g. faucets and low-flow showerheads) shall be modeled the same for both the baseline building design and the proposed design. Other SService hot-water usage can be demonstrated to be reduced by documented water conservation measures that reduce the physical volume of service water required. ~~Examples include low-flow shower heads.~~ Such reduction shall be demonstrated by calculations. 2. Service hot-water energy consumption can be demonstrated to be reduced by reducing the required temperature of service mixed water, by increasing the temperature, or by increasing the temperature of the entering makeup water. Examples include alternative sanitizing technologies for dishwashing and heat recovery to entering makeup water. Such reduction shall be demonstrated by calculations. 3. Service hot-water usage can be demonstrated to be reduced by reducing the hot fraction of mixed water to achieve required operational temperature. Examples include shower or laundry heat recovery to incoming cold-water supply, reducing the hot-water fraction required to meet required mixed-water temperature. Such reduction shall be demonstrated by calculations.
12. Receptacle and Other Loads	
Receptacle and process loads where not otherwise covered by this code, such as those for office and other equipment, shall be estimated based on the building type or space type category and shall be assumed to be identical in the *proposed* and *baseline building designs*~~, except as specifically authorized by the *rating authority*~~. These loads shall be included in simulations of the building and shall be included when calculating the *baseline building performance* and *proposed building performance*.	Other systems, such as motors covered by ~~Section 10~~Chapter 14, and miscellaneous loads shall be modeled as identical to those in the *proposed design* including schedules of operation and control of the equipment. Where there are specific *efficiency* requirements in ~~Section 10~~Chapter 14, these systems or components shall be modeled as having the lowest *efficiency* allowed by those requirements. Where no efficiency requirements exist, power and energy rating or capacity of the equipment shall be identical between the *baseline building* and the *proposed design* with the following exception: variations of the power requirements, schedules, or control sequences of the equipment modeled in the *baseline building* from those in the *proposed design* may be allowed by the ~~*rating authority*~~*building official* based upon documentation that the equipment installed in the *proposed design* represents a significant verifiable departure from documented conventional practice. The burden of this documentation is to demonstrate that accepted conventional practice would result in *baseline building* equipment different from that installed in the *proposed design*. Occupancy and occupancy schedules may not be changed. Baseline building process loads must represent a minimum of 25% of the total building energy usage. For buildings where the process energy is less than 25% of the baseline building energy usage, the permit submittal must include supporting documentation substantiating that process energy inputs are appropriate.
13. Modeling Limitations to the Simulation Program	
If the simulation program cannot model a component or system included in the *proposed design* explicitly, substitute a thermodynamically similar component model that can approximate the expected performance of the component that cannot be modeled explicitly. See Table G3.1a for specific default loads	Same as Proposed Design.

TABLE G3.1a

Acceptable Occupancy Densities, Receptacle Power Densities and Service Hot Water Consumption[1]

Building Type	Occupancy Density[2] Sq.Ft./Person ($Btu/h \cdot ft^2$)	Receptacle Power Density[3] Watts/Sq.Ft. ($Btu/h \cdot ft^2$)	Service Hot Water Quantities[4] Btu/h · Person
Assembly	50 (4.60)	0.25 (0.85)	215
Health/Institutional	200 (1.15)	1.00 (3.41)	135
Hotel/Motel	250 (0.92)	0.25 (0.85)	1,110
Light Manufacturing	750 (0.31)	0.20 (0.68)	225
Multi-Family Residential		***0.5***	
Office	275 (0.84)	0.75 (2.56)	175
Parking Garage	NA	NA	NA

Restaurant	100 (2.30)	0.10 (0.34)	390
Retail	300 (0.77)	0.25 (0.85)	135
School	75 (3.07)	0.50 (1.71)	215
Warehouse	15,000 (0.02)	0.10 (0.34)	225

1. The occupancy densities, receptacle power densities, and service hot water consumption values are from ASHRAE Standard 90.1-***2007*** and addenda.
2. Values are in square feet of conditioned floor area per person. Heat generation in Btu per person per hour is 230 sensible and 190 latent. Figures in parenthesis are equivalent Btu per hour per square foot.
3. Values are in Watts per square foot of conditioned floor area. Figures in parenthesis are equivalent Btu per hour per square foot. These values are the minimum acceptable. If other process loads are not input (such as for computers, cooking, refrigeration, etc.), it is recommended that receptacle power densities be increased until total process energy consumption is equivalent to 25% of the total.
4. Values are in Btu per person per hour.

G3.1.2 General *Baseline* HVAC System Requirements. HVAC systems in the *baseline building design* shall conform with the general provisions in this section.

Baseline HVAC System Types

Building Type	Fossil Fuel, Fossil/Electric Hybrid, and Purchased Heat	Electric and Other
Residential	System 1—PTAC	System 2—PTHP
Nonresidential and 3 Floors or Less and <25,000 ft^2	System 3—PSZ-AC	System 4—PSZ-HP
Nonresidential and 4 or 5 Floors and <25,000 ft^2 or 5 Floors or Less and 25,000 ft^2 to 150,000 ft^2	System 5—Packaged VAV with Reheat	System 6—Packaged VAV with PFP Boxes
Nonresidential and More than 5 Floors or >150,000 ft^2	System 7—VAV with Reheat	System 8—VAV with PFP Boxes

Notes:
Residential building types include dormitory, hotel, motel, and multifamily. Residential space types include guest rooms, living quarters, private living space, and sleeping quarters. Other building and space types are considered nonresidential.
Where no heating system is to be provided or no heating energy source is specified, use the "Electric and Other" heating source classification.
Where attributes make a building eligible for more than one *baseline* system type, use the predominant condition to determine the system type for the entire building.
For laboratory spaces with a minimum of 5000 cfm of exhaust, use system type 5 or 7 and reduce the exhaust and makeup air volume to 50% of design values during unoccupied periods. For all-electric buildings, the heating shall be electric resistance.

Baseline System Descriptions

System No.	System Type	Fan Control	Cooling Type	Heating Type[1]
1. PTAC	Packaged terminal air conditioner	Constant volume	Direct expansion	Hot-water fossil fuel boiler
2. PTHP	Packaged terminal heat pump	Constant volume	Direct expansion	Electric heat pump
3. PSZ-AC	Packaged rooftop air conditioner	Constant volume	Direct expansion	Fossil fuel furnace
4. PSZ-HP	Packaged rooftop heat pump	Constant volume	Direct expansion	Electric heat pump
5. Packaged VAV with Reheat	Packaged rooftop VAV with reheat	VAV	Direct expansion	Hot-water fossil fuel boiler
6. Packaged VAV with PFP Boxes	Packaged rooftop VAV with reheat	VAV	Direct expansion	Electric resistance
7. VAV with Reheat	Packaged rooftop VAV with reheat	VAV	Chilled water	Hot-water fossil fuel boiler
8. VAV with PFP Boxes	VAV with reheat	VAV	Chilled water	Electric resistance

[1]Heating fuel source for the baseline system shall match the proposed system in all cases for both primary and supplemental heat.

~~1)~~**G3.1.2.1 Equipment Efficiencies.** All HVAC equipment in the *baseline building design* shall be modeled at the minimum *efficiency* levels, both part load and full load, in accordance with ~~Section 6.4~~Chapter 14.Where *efficiency* ratings, such as EER and COP, include fan energy, the descriptor shall be broken down into its components so that supply fan energy can be modeled separately.

~~b.~~**G3.1.2.5 Ventilation.** Minimum *outdoor air* ventilation rates shall be the same for the *proposed* and *baseline building designs.*

~~*Note:*~~ **Exception:** When modeling demand-control ventilation in the *proposed design* when its use is not required by ~~Section 6.4.3.8~~Chapter 14.

G3.1.2.6 Economizers. Outdoor air economizers shall not be included in *baseline* HVAC Systems 1 and 2. *Outdoor air* economizers shall be included in *baseline* HVAC Systems 3 through 8 ~~based on climate as specified in Table G3.1.2.6A~~.

Or…

Outdoor air economizers shall be included in baseline HVAC systems as required in Chapter 14.

~~c.~~**Exceptions:** Economizers shall not be included for systems meeting one or more of the exceptions listed below.

~~2.~~a. Systems that include gas-phase air cleaning to meet the requirements of Section 6.1.2 in Standard 62.1. This exception shall be used only if the system in the *proposed design* does not match the *building design*.

~~**Exceptions:**~~b. Where the use of *outdoor air* for cooling will affect supermarket open refrigerated casework systems. This exception shall only be used if the system in the *proposed design* does not use an economizer. If the exception is used, an economizer shall not be included in the *baseline building design.*

G3.1.2.9 System Fan Power. System fan electrical power for supply, return, exhaust, and relief (excluding power to fan-powered VAV boxes) shall be calculated using the following formulas:

For Systems 1 and 2,

$$P_{fan} = CFM_S \times 0.3.$$

For systems 3 through 8,

$$P_{fan} = \text{bhp} \times 746 / \text{Fan Motor Efficiency}.$$

where

P_{fan} = electric power to fan motor (watts) and
bhp = brake horsepower of *baseline* fan motor from Table G3.1.2.9
Fan Motor Efficiency = the efficiency from ~~Table 10.8~~Chapter 14 for the next motor size greater than the bhp using the enclosed motor at 1800 rpm.
CFM_S = the baseline system maximum design supply fan airflow rate in cfm

TABLE G3.1.2.9 Baseline Fan Brake Horsepower

Baseline Fan Motor Brake Horsepower	
Constant Volume Systems 3–4	**Variable Volume Systems 5–8**
$CFM_s \cdot 0.00094 + A$	$CFM_s \cdot 0.0013 + A$

Where *A* is calculated ~~according to Section 6.5.3.1.1~~as follows using the pressure drop adjustment from the proposed building design and the design flow rate of the baseline building system.
A = Sum of [PD x CFMD / 4131] where:
PD = Each applicable pressure drop adjustment from the table below in in. w.c.
CFMD = the design air flow through each applicable device from the table below in cubic feet per minute
Do not include pressure drop adjustments for evaporative coolers or heat recovery devices that are not required in the baseline building system by Section G3.1.2.10.

~~G3.1.2.10~~ **Exhaust Air Energy Recovery.** Systems shall conform with the provisions of Chapter 14 ~~Individual fan systems that have both a design supply air capacity of 5000 cfm or greater and have a minimum outdoor air supply of 70% or greater of the design supply air quantity shall have an energy recovery system with at least 50% recovery effectiveness. Fifty percent energy recovery effectiveness shall mean a change in the enthalpy of the *outdoor air* supply equal to 50% of the difference between the *outdoor air* and return air at design conditions. Provision shall be made to bypass or control the heat recovery system to permit air economizer operation, where applicable.~~

~~**Exceptions:** If any of these exceptions apply, exhaust air energy recovery shall not be included in the *baseline building design:*~~

~~a. Systems serving spaces that are not cooled and that are heated to less than 60°F.~~

~~b. Systems exhausting toxic, flammable, or corrosive fumes or paint or dust. This exception shall only be used if exhaust air energy recovery is not used in the *proposed design*.~~

~~c. Commercial kitchen hoods (grease) classified as Type 1 by NFPA 96. This exception shall only be used if exhaust air energy recovery is not used in the *proposed design*.~~

~~d. Heating systems in climate zones 1 through 3.~~

~~e. Cooling systems in climate zones 3c, 4c, 5b, 5c, 6b, 7, and 8.~~

~~f. Where the largest exhaust source is less than 75% of the design outdoor airflow. This exception shall only be used if exhaust air energy recovery is not used in the *proposed design*.~~

~~g. Systems requiring dehumidification that employ energy recovery in series with the cooling coil. This exception shall only be used if exhaust air energy recovery and series-style energy recovery coils are not used in the *proposed design*.~~

h. ~~Systems serving laboratories with exhaust rates of 5000 cfm or greater~~.

June 5, 2009

>Log # 09-016<:

Revised the Small Business Compliance Table

As mitigating factor to proposed changes to glazing U-values:

TABLE 10-6B

ALL OCCUPANCIES:

SMALL BUSINESS COMPLIANCE TABLE

DEFAULT U-FACTORS FOR VERTICAL GLAZING

Vertical Glazing Description				Frame Type		
Panes	Low-e[1]	Spacer	Fill	Any Frame	Aluminum Thermal Break[2]	Wood / Vinyl Fiberglass
Double[3]	A	Any	Argon	0.48	0.41	0.32
	B	Any	Argon	0.46	0.39	0.30
	C	Any	Argon	0.44	0.37	0.28
	C	High Performance	Argon	0.42	0.35	Deemed to comply[5]
Triple[4]	A	Any	Air	0.50	0.44	0.26
	B	Any	Air	0.45	0.39	0.22
	C	Any	Air	0.41	0.34	0.20
	Any, double low-e	Any	Air	0.35	0.32	0.18

FOOTNOTES TO TABLE 10-6B

1. Low-eA (emissivity) shall be 0.24 to 0.16
   Low-eB (emissivity) shall be 0.15 to 0.08
   Low-eC (emissivity) shall be 0.07 or less

2. Aluminum Thermal Break = An aluminum thermal break framed window shall incorporate the following minimum design characteristics:
   a) The thermal conductivity of the thermal break material shall be not more than 3.6 Btu-in/h/ft^2/F°;
   b) The thermal break material must produce a gap in the frame material of not less than 0.210 inches; and,
   c) All metal framing members of the products exposed to interior and exterior air shall incorporate a thermal break meeting the criteria in a) and b) above.

3. A minimum air space of 0.375 inches between panes of glass is required for double glazing.

4. A minimum air space of 0.25 inches between panes of glass is required for triple glazing.

5. Deemed to comply glazing shall not be used for performance compliance.

GROUP R OCCUPANCY:
SMALL BUSINESS COMPLIANCE TABLE FOR VERTICAL GLAZING[1]

DESCRIPTION[2,3,4,6]	FRAME TYPE[7,8]			
	ALUMINUM	ALUM. THERMAL BREAK[9]	WOOD/VINYL	ALUM. CLAD WOOD/REINFORCED VINYL[10]
Double, Clear ¼"	0.82	0.66	0.56	0.59
Double, Clear ¼" + argon	0.77	0.63	0.53	0.56
Double, Low-e4 ¼"	0.76	0.61	0.52	0.54
Double, Low-e2 ¼"	0.73	0.58	0.49	0.51
Double, Low-e1 ¼"	0.70	0.55	0.47	0.49
Double, Low-e4 ¼" + argon	0.70	0.55	0.47	0.49
Double, Low-e2 ¼" + argon	0.66	0.52	0.43	0.46
Double, Low-e1 ¼" + argon	0.64	0.50	0.41	0.43
Double, Clear 3/8"	0.78	0.63	0.54	0.57
Double, Clear 3/8" + argon	0.75	0.60	0.51	0.54
Double, Low-e4 3/8"	0.72	0.57	0.48	0.51
Double, Low-e2 3/8"	0.69	0.54	0.45	0.48
Double, Low-e1 3/8"	0.66	0.51	0.43	0.46
Double, Low-e4 3/8" + argon	0.68	0.53	0.44	0.47
Double, Low-e2 3/8" + argon	0.63	0.49	0.41	0.44
Double, Low-e1 3/8" + argon	0.61	0.47	0.35	0.41
Double, Clear ½"	0.75	0.60	0.50	0.54
Double, Clear ½" + argon	0.72	0.58	0.48	0.51
Double, Low-e4 ½"	0.68	0.53	0.44	0.47
Double, Low-e2 ½"	0.64	0.50	0.40	0.44
Double, Low-e1 ½"	0.61	0.47	0.35[5]	0.42
Double, Low-e4 ½" + argon	0.65	0.50	0.42	0.44
Double, Low-e2 ½" + argon	0.60	0.46	0.37	0.40
Double, Low-e1 ½" + argon	0.58	0.43	0.34	0.38
Triple, Clear ¼"	0.66	0.52	0.42	0.44
Triple, Clear ¼" + argon	0.63	0.49	0.39	0.42
Triple, Low-e4 ¼"	0.64	0.50	0.40	0.40
Triple, Low-e2 ¼"	0.62	0.48	0.39	0.41
Triple, Low-e1 ¼"	0.61	0.47	0.38	0.40
Triple, Low-e4 ¼" + argon	0.60	0.46	0.37	0.39
Triple, Low-e2 ¼" + argon	0.58	0.43	0.34	0.37
Triple, Low-e1 ¼" + argon	0.57	0.42	0.34	0.36
Triple, Clear ½"	0.61	0.46	0.37	0.40
Triple, Clear ½" + argon	0.59	0.45	0.36	0.38
Triple, Low-e4 ½"	0.58	0.43	0.35	0.37
Triple, Low-e2 ½"	0.55	0.41	0.32	0.35
Triple, Low-e1 ½"	0.54	0.39	0.31	0.33
Triple, Low-e4 ½" + argon	0.55	0.41	0.32	0.35
Triple, Low-e2 ½" + argon	0.52	0.38	0.30	0.32
Triple, Low-e1 ½" + argon	0.51	0.37	0.29	0.31
Triple, 2 Low-e2 ½"	0.52	0.35	0.30	0.31
Triple, 2 Low-e1 ½"	0.50	0.34	0.28	0.29
Triple, 2 Low-e2 ½" + argon	0.49	0.33	0.28	0.28
Triple, 2 Low-e1 ½" + argon	0.47	0.30	0.26	0.26

FOOTNOTES TO TABLE 10-6B

1. Subtract 0.02 from the listed default U-factor for non-aluminum spacer. Acceptable spacer materials may include but is not limited to fiberglass, wood and butyl or other material with an equivalent thermal performance.

2. ~~1/4" = a minimum dead air space of 0.25 inches between the panes of glass.~~
~~3/8" = a minimum dead air space of 0.375 inches between the panes of glass.~~
~~1/2"= a minimum dead air space of 0.5 inches between the panes of glass.~~
~~Product with air spaces different than those listed above shall use the value for the next smaller air space; i.e. 3/4 inch = 1/2 inch U-factors, 7/16 inch = 3/8 inch U-factors, 5/16 inch = 1/4 inch U-factors.~~

3. ~~Low-e4 (emissivity) shall be 0.4 or less.~~
~~Low-e2 (emissivity) shall be 0.2 or less.~~
~~Low-e1 (emissivity) shall be 0.1 or less.~~

4. ~~U-factors listed for argon shall consist of sealed, gas-filled insulated units for argon, CO2, SF6, and argon/SF6 mixtures. The following conversion factor shall apply to Krypton gas-filled units: 1/4" or greater with krypton is equivalent to 1/2" argon.~~

5. ~~For this assembly only, products shall be deemed to comply if they have an emissivity of 0.16 or less.~~

6. ~~"Glass block" assemblies may use a U-factor of 0.51.~~

7. ~~Insulated fiberglass framed products shall use wood/vinyl U-factors.~~

8. ~~Subtract 0.02 from the listed default values for solariums.~~

9. ~~Aluminum Thermal Break = An aluminum thermal break framed window shall incorporate the following minimum design characteristics:~~
~~a) The thermal conductivity of the thermal break material shall be not more than 3.6 Btu-in/h/ft^2/F°;~~
~~b) The thermal break material must produce a gap in the frame material of not less than 0.210 inches; and,~~
~~c) All metal framing members of the products exposed to interior and exterior air shall incorporate a thermal break meeting the criteria in a) and b) above.~~

10. ~~Aluminum clad wood windows shall use the U-factors listed for Aluminum Clad Wood/Reinforced Vinyl windows. Vinyl clad wood window shall use the U-factors listed for Wood/Vinyl windows. Any vinyl frame window with metal reinforcement in more than one rail shall use the U-factors listed for Aluminum Clad Wood/Reinforced Vinyl window.~~

Log # 09-134:
Recommend Further Modifications
As mitigating factor to proposed changes to glazing U-values:

Section 502.4.5 Building Air Leakage Testing. Building envelope air leakage control shall be considered acceptable when tested to have an air leakage is less than 0.00030 Specific Leakage Area (SLA) when tested with a blower door at a pressure of 50 pascals (0.2 inch w.g.). Testing shall occur any time after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and combustion appliances and sealing thereof. When required by the building official, the test shall be conducted in the presence of department staff. The blower door test results shall be recorded on the certificate required in section 105.4.

Exceptions: 1. Additions less than 750 square feet.

2. Once a visual inspection has confirmed the presence of a gasket (see Section 502.4), operable windows and doors manufactured by a small business shall be permitted to be sealed off at the frame prior to the test.

June 12, 2009

Log # 09-071:
Recommend Approval with Modifications:

105.4 Certificate. A permanent certificate shall be posted ~~on or in~~within three feet of the electrical distribution panel. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant *R*-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor), and ducts outside conditioned spaces; *U*-factors for fenestration; and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the type and efficiency of heating, cooling, service water heating equipment, duct leakage rates including test conditions as specified in Section 503.10.2, and air leakage results if a blower door test was conducted.

Log # 09-059:
Recommend Approval with Modifications:

502.4.4 Recessed ~~Lighting Fixtures~~ Luminaires: When installed in contact with the building envelope, recessed ~~lighting fixtures~~ luminaires shall be Type IC rated and certified under ASTM E283~~under ASTM E283~~ to have no more than 2.0 cfm air movement from the conditioned space to the ceiling cavity. The lighting fixture shall be tested at 75 Pascals or 1.57 lbs/ft^2 pressure difference and have a label attached, showing compliance with this test method. Recessed ~~lighting fixtures~~ luminaires shall be installed with a gasket or caulk between the fixture and ceiling to prevent air leakage.

Log # 09-0135:
Recommend Approval with Modifications:

503.4.1 Fan Power: Furnace and space conditioning air handling equipment covered under this section shall have direct induction fans (variable speed DC motors) with the capability of having reduced speed of at least 75% of the main rating power. The use of these fans for ventilation or circulation separate from space conditioning, shall be restricted to a maximum of 50% of the rated fan power.

June 19, 2009

Log # 09-087:
Recommend Approval with Modifications:

602.2 Exterior Walls Both Above and Below Grade: Above grade exterior walls shall be insulated to not less than the nominal R-value specified in Table 6-1 or 6-2 as applicable. The following walls should be considered to meet R-21 without additional documentation:

1. 2 x 6 framed and insulated with R-21 fiberglass batts.
2. 2 x 4 framed and insulated with R-15 fiberglass batts plus R-4.0 foam sheathing.
3. 2 x 4 framed and insulated with R-13 fiberglass batts plus R-5.0 foam sheathing.
4. 2 x 6 framed and insulated to full depth with spray applied or blown insulation having a minimum R-value of 3.6 per inch of thickness.

Log # 09-172:
Recommend Approval with Modifications:

Replace previous proposal with the following:

Chapter 2, Add the Following Definition:

COMMISSIONING: Commissioning is a systematic process of verification and documentation that ensures that the selected building systems have been designed, installed and function properly, efficiently, and can be maintained in accordance with the contract documents in order to satisfy the building owner's design intent and operational requirements.

1513.7 Commissioning Requirements: For lighting controls which include daylight or occupant sensing automatic controls, automatic shut-off controls, occupancy sensors, or automatic time switches, the lighting control shall be tested to ensure that control devices, components, equipment, and systems are calibrated, adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to ensure they operate in accordance with approved plans and specifications. See Section 1416 for complete requirements. Optional examples of test methods and forms are provided in Reference Standard 33. ~~A complete report of test procedures and results shall be prepared and filed with the owner. Drawing notes shall require commissioning in accordance with this paragraph.~~

(Chapter 7, Add RS 33)

SECTION 1120 — SCOPE

This Code sets forth minimum requirements for the design and commissioning of new or altered buildings and structures or portions thereof that provide facilities or shelter for public assembly, educational, business, mercantile, institutional, storage, factory, and industrial occupancies by regulating their exterior envelopes and the selection of their HVAC, service water heating, electrical distribution and illuminating systems, and equipment for efficient use and conservation of energy.

1135 Commissioning. Commissioning in compliance with Sections 1416 and 1513.7 shall be required for shall be required for new systems or modified portions of systems, with a heating capacity of 600K Btu/h or a cooling capacity of 40 tons or more.

1141 Plans and Specifications

1141.2 Details: The plans and specifications shall show in sufficient detail all pertinent data and features of the building and the equipment and systems as herein governed including, but not limited to: design criteria; exterior envelope component materials, U-factors of the envelope systems, R-values of insulating materials; U-factors and solar heat gain coefficients or shading coefficients of glazing; area weighted U-factor calculations; efficiency, economizer, size and type of apparatus and equipment; fan system horsepower; equipment and systems controls; lighting fixture schedule with wattages and controls narrative; commissioning requirements for HVAC equipment, HVAC controls, and Lighting controls and other pertinent data to indicate compliance with the requirements of this Code.

1141.5 Commissioning Details/Specifications: When required by the building official, the plans submitted in support of a building permit shall include a list of the functional tests required to comply with Commissioning in accordance with Sections 1513.7 and 1416 as well as the name of the Commissioning Agent for buildings over 50,000 sq ft.

Delete Existing Section 1416 and Replace as Follows:

SECTION 1416 –COMMISSIONING AND COMPLETION REQUIREMENTS
1416.1 General. Drawing notes or specifications shall require commissioning and completion requirements in accordance with this section..

1416.2 Commissioning Scope. Commissioning in compliance with this section and section 1513.7 shall be required for new systems or modified portions of systems, with a heating capacity of 600K Btu/h or a cooling capacity of 40 tons or more.

1416.2.1 Buildings which require commissioning shall go through a commissioning process that includes as a minimum:

1) Commissioning Plan,
2) Systems Testing and Balancing,
3) HVAC Equipment and HVAC Controls Functional Testing,
4) Supporting Documentation in the form of Operation and Maintenance, and Record Documents.
5) Commissioning Report.

1416.3 Commissioning Requirements

1416.3.1 Commissioning Plan. Commissioning Plan shall include:

~~2)~~1) A general description of the Commissioning Process activities including the systems to be commissioned,

~~3)~~2) The scope of the commissioning process including Systems Testing and Balancing, Functional Testing, and Supporting Documentation,

~~4)~~3) Roles and responsibilities of the Commissioning Team,

~~5)~~4) A schedule of activities including Systems Testing and Balancing, Functional Testing, and Supporting Documentation

~~6)~~5) Functional Test procedures and forms.

1416.3.2 Systems Testing and Balancing

1416.3.2.1 General. All HVAC air and hydronic systems shall be balanced in accordance with generally accepted engineering standards.

1416.3.2.2 Air Systems Balancing. Throttling losses shall be minimized by balancing the systems or adjusting the speed of fans with motors greater than 1 hp.

1416.3.2.3 Hydronic Systems Balancing. Throttling losses shall be minimized by balancing the systems, or trimming the pump impeller or adjusting the pump speed. To facilitate balancing each hydronic system shall have either the ability to measure pressure across each pump, or test ports at each side of each pump.

Exceptions:

1. Pumps with pump motors of 10 hp or less.
2. Throttling is an acceptable method of balancing only if the power draw does not exceed that of equivalent system with the impeller trimmed by more than 5%.

1416.3.3 Functional Testing. Systems, Equipment, and Controls Functional Testing. All HVAC systems, equipment, and controls as well as and lighting controls as specified in 1513.7 shall be tested to ensure that control devices, components, equipment and systems are calibrated, adjusted and operate in accordance with sequences of operation prescribed in the construction documents. Written procedures which clearly describe the individual systematic test procedures, the expected systems' response or acceptance criteria for each procedure, the actual response or findings, and any pertinent discussion. Optional examples of test methods and forms are provided in Reference Standard 33.

(Chapter 7, Add RS 33)

1416.3.4 Supporting Documentation. Supporting documentation shall include, as a minimum:

1416.3.4.1 Systems Documentation. Systems documentation shall be in accordance with industry accepted standards and shall include as a minimum:

1) Submittal data stating equipment size and selected options for each piece of equipment
2) Operation and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.
3) Names and addresses of at least one HVAC service agency.

4) HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, as-built drawings and control sequence descriptions. Desired or field determined set points shall be permanently recorded on control drawings at control devices, or, for digital control systems, in programming comments.
5) Complete written narrative of how each system and piece of equipment is intended to operate including interface with existing equipment or systems (where applicable). Sequence of Operation is not acceptable as a narrative for this requirement.

1416.3.4.2 Record Documents. Construction documents shall be updated to convey a record of the alterations to the original design. Such updates shall include updated mechanical, electrical and control drawings red-lined, or redrawn if specified, that show all changes to size, type and location of components, equipment and assemblies.

1416.3.4.3 Systems Operation Training. Training of the maintenance staff for each equipment type and or system shall include as a minimum:
1) Review of Systems Documentation.
2) Hands-on demonstration of all normal maintenance procedures, normal operating modes, and all emergency shutdown and start-up procedures.
3) Training completion report.

1416.3.5 Commissioning Report. The Commissioning Report shall be completed and provided to the Owner. The commissioning report shall include:
~~2)~~1) Completed Functional Test forms including measurable criteria for test acceptance.
~~3)~~2) Issues Log of corrected and uncorrected deficiencies with the anticipated date of correction.
~~4)~~3) Deferred tests, which cannot be performed at the time of report preparation due to climatic conditions with anticipated date of completion.
~~5)~~4) Record of progress and completion of operator training.
~~6)~~5) Completed Commissioning Compliance Form

1416.4 Commissioning Compliance Form. A commissioning compliance checklist shall be submitted to the building official upon substantial completion of the building. The checklist shall be completed and signed by the building owner or owner's representative. The building official may require that the commissioning compliance form components be submitted to verify compliance with Section 1416 and 1513.7 requirements. Completion of the Commissioning Compliance Checklist (Figure 1416.4) deems to satisfy this requirement:

Figure 1416.4. Commissioning Compliance Checklist

PROJECT Information	**Project Name:**
	Project Address:
	Commissioning Authority:

COMMISSIONING Plan (Section 1416.3.1)	❑ **Commissioning Plan was used during construction and included items below** • A written schedule including Systems Testing and Balancing, Functional Testing, and Supporting Documentation • Roles and Responsibilities of the commissioning team • Functional Test procedures and forms
SYSTEMS Balancing (Section 1416.3.2)	❑ **Systems Balancing has been completed** • Air and Hydronic systems are proportionately balanced in a manner to first minimize throttling losses • Test ports are provided on each pump for measuring pressure across the pump.

Functional Testing	❑ **HVAC Systems Functional Testing has been completed** (Section 1416.3.3) HVAC systems have been tested to ensure that equipment, components, and sub-systems are installed, calibrated, adjusted and operate in accordance with approved plans and specifications
	❑ **HVAC Controls Functional Testing has been completed** (Section 1416.3.3) HVAC controls have been tested to ensure that control devices are calibrated, adjusted and operate properly. Sequences of operation have been functionally tested to ensure they operate in accordance with approved plans and specifications
	❑ **Lighting Controls Functional Testing has been completed** (Section 1513.7) Lighting controls have been tested to ensure that control devices, components, equipment, and systems are calibrated, adjusted and operate in accordance with approved plans and specifications
SUPPORTING DOCUMENTS (SECTION 1416.3.4)	❑ **Systems documentation, record documents and training have been completed or are scheduled** ● System documentation has been provided to the owner or scheduled date: _____ ● Record documents have been submitted to owner or scheduled date: _____ ● Training has been completed or scheduled date: _____
COMMISSIONING Report (Section 1416.3.5)	❑ **Commissioning Report submitted to Owner and includes items below** ● Completed Functional Tests documentation ● Deficiencies found during testing required by this section which have not been corrected at the time of report preparation and the anticipated date of correction ● Deferred tests, which cannot be performed at the time of report preparation due to climatic conditions or other circumstances beyond control of Commissioning Authority.
CERTIFICATION	❑ I hereby certify that all requirements for Commissioning have been completed in accordance with Washington State Energy Codes, including all items above. --- Building Owner or Owner's Representative Date

Log # 09-145:
Recommend Approval with Modifications:

1411.2.1 Water-cooled centrifugal water-chilling packages- non-standard conditions. Water-cooled centrifugal water-chilling packages that are not designed for operation at ARI Standard 550/590 test conditions reflected in~~, and thus cannot be tested to meet the requirements of~~ Table 14-1C ~~of (~~44°F leaving chilled-water temperature and 85°F entering condenser water temperature with 3 gpm/ton condenser water flow~~)~~ shall have maximum full-load kW/ton and *NPLV* ratings adjusted using the following equation:

Adjusted maximum Full load kW/ton rating = [full load kW/ton from Table ~~1317.5.1 (4)~~14-1C]/K_{adj}

Adjusted maximum NPLV rating = [IPLV from Table 14-1C~~1317.5.1 (4)~~]/ K_{adj}

Where:

$K_{adj} = 6.174722 - 0.303668(X) + 0.00629466(X)^2 - 0.000045780(X)^3$
$X = DT_{std} + LIFT$
DT_{std} = (24+[full load kW/ton from Table ~~1317.5.1 (4)~~14-1C] x 6.83)/Flow
Flow = Condenser water flow (GPM)/Cooling Full Load Capacity(Tons)
LIFT = CEWT - CLWT
CEWT = Full Load Condenser Entering Water Temperature (F)
CLWT = Full Load Leaving Chilled Water Temperature (F)
The adjusted full load and *NPLV* values are only applicable over the following full-load design ranges:

• Minimum Leaving Chiller-Water Temperature: 38°F

• Maximum Condenser Entering Water Temperature: 102°F

• Condenser Water flow: 1 to 6 gpm/ton, and

• X ≥39 and ≤60

Chillers designed to operate outside of these ranges or applications utilizing fluids or solutions with secondary coolants (e.g., glycol solutions or brines) with a freeze point of 27°F or lower for freeze protection are not covered by this standard.

Log # 09-034:
Recommend Approval with Modifications:

1411.5 Heating Systems in Unenclosed Spaces. Where comfort heating is provided to unenclosed spaces, only radiant heating systems shall be used unless otherwise approved by the building official. The heating system shall be controlled by an occupancy sensor. An unenclosed space is one that is not substantially surrounded by solid surfaces such as walls, floors, roofs, and openable devices such as doors and operable windows. Warehouses and repair garages are considered enclosed spaces.

Log # 09-146:
Recommend Approval with Modifications:

1412.1 Temperature Controls: Each system shall be provided with at least one temperature control device. Each zone shall be controlled by individual thermostatic controls responding to temperature within the zone. At a minimum, each floor of a building shall be considered as a separate zone. ~~Thermostats controlling~~ Controls on systems required to have economizers and serving single zones shall have multiple cooling stage capability and that activate the economizer when appropriate as the first stage of cooling.~~s and be wired to activate the economizer as the first stage of cooling before mechanical cooling is activated.~~ See Sections 1423 or 1433 for further economizer control requirements.

Log # 09-150:
Recommend Approval with Modifications:

1412.8 Ventilation Controls for High-Occupancy Areas: Demand control ventilation (DCV) is required for spaces that are larger than 500 ft^2, have an occupant density ~~design occupancy~~ for ventilation of ~~40~~25 people or more per 1000 ft^2 of floor area (based upon the ~~Maximum Occupancy~~Default Occupant Density column of Table ~~3-4~~403.3 of the ~~WAVIAQ~~IMC), and are served by systems with one or more of the following:

a. An air-side economizer,

b. Automatic modulating control of the outdoor air damper, or

c. A design ~~maximum~~ outdoor ventilation airflow of all systems serving the space combined greater than 3000 cfm.

EXCEPTIONS: 1. Systems with energy recovery complying with Section 1436.~~1.Systems with energy recovery complying with Section 1436.~~

~~2. Multiple-zone systems without direct digital control of individual zones communicating with a central control panel.~~

~~1~~3~~2~~3. Spaces ~~Systems~~ with a combined design outdoor airflow less than ~~1200~~1000 cfm.

~~2~~43. Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than ~~1200~~1000 cfm.

Log # 09-153:
Recommend Approval with Modifications:
(Portions of proposal not shown have not been modified)

1421 System Type: To qualify as a simple system, systems must have no active humidification or simultaneous heating and cooling and shall be one of the following:

a. Air cooled, constant volume packaged equipment, which provide heating, cooling or both, and require only external connection to duct work and energy services with cooling capacity of 135,000 Btu/h or less.

b. Air cooled, constant volume split systems, which provide heating, cooling or both, with cooling capacity of 84,000 Btu/h or less.

c. Heating only systems which have a capacity of less than ~~5,000~~1,000 cfm or which have a minimum outside air supply of less than ~~70~~30% of the total air circulation.

The combined airflow rate of all simple systems serving single rooms must be less than 10,000CFM or they do not qualify as simple systems.

All other systems shall comply with Sections 1430 through 1439.

1432.5 Variable air volume system static pressure reset controls. The system static pressure set point shall be reset to the lowest point possible while still providing the required air flow to the zones with the greatest demand. ~~Maximum setpoint shall be no more than one-third total fan design static pressure.~~

Exception: Systems where fan speed is reset directly based on zone airflows or other zone load indicators.

~~**1432.6 Humidity control:** If a system is equipped with a means to add moisture to maintain specific humidity levels in a zone or zones, a humidity control device shall be provided.~~

~~**1432.6.1 Humidity Setpoint Limits:** The humidity control device shall be set to prevent the use of fossil fuel or electricity to produce relative humidity in excess of 30 percent. Where a humidity control device is used for dehumidification, it shall be set to prevent the use of fossil fuel or electricity to reduce relative humidity below 60 percent.~~

~~Exception: Hospitals, process needs, archives, museums, critical equipment, and other non-comfort situations with specific humidity requirements outside this range.~~

~~**1432.6.2 Deadband:** Humidity controls shall maintain a deadband of at least 10% relative humidity where no active humidification or dehumidification takes place.~~

~~**1432.6.3 Multiple Devices:** Where multiple humidity control devices are used to control humidity in a zone or adjacent zones without separating walls, means shall be provided to prevent simultaneous humidification and dehumidification.~~

~~**1432.6.4 Humidifier Preheats:** Humidifiers with preheating devices mounted in the air stream shall be provided with an automatic valve to shut off preheat when humidification is not required.~~

Log # 09-157:
Recommend Approval with Modifications:

1438 ~~Variable Flow Systems and~~ **System Criteria:** For fans and pumps 7.5 hp and greater including custom and packaged air handlers serving variable air volume fan systems, constant volume fans, heating and cooling hydronic pumping systems, pool and service water pumping systems, domestic water pressure boosting systems, cooling tower fans, and other pumps or fans where variable flows are required, ~~than 10 hp, where the application involves variable flow, and water source heat pump loops subject to the requirements of Section 1432.2.2~~, there shall be:

a. Variable speed drives, or

b. Other controls and devices that will result in fan and pump motor demand of no more than 30% of design wattage at 50% of design air volume for fans when static pressure set point equals 1/3 the total design static pressure, and 50% of design water flow for pumps, based on manufacturer's certified test

data. Variable inlet vanes, throttling valves (dampers), scroll dampers or bypass circuits shall not be allowed.

EXCEPTIONS: Variable speed devices are not required for motors that serve:

1. Fans or pumps in packaged equipment where variable speed devices are not available as a factory option from the equipment manufacturer.

2. Fans or pumps that are required to operate only for emergency fire-life-safety events (e.g. stairwell pressurization fans, elevator pressurization fans, fire pumps, etc.).

~~Static pressure sensors used to control variable air volume fans shall be placed in a position such that the controller set point is no greater than 1/3 the total design fan static pressure.~~

~~For systems with direct digital control of individual zone boxes reporting to the central control panel, there shall be static pressure reset controls and the static pressure set point shall be reset based on the zone requiring the most pressure; i.e., the set point is reset lower until one zone damper is nearly wide open.~~

~~Units designed for constant volume fan operation during heating or cooling shall operate at 60% flow or less or at the minimum ventilation flow rate if it is larger than 60% while not heating or cooling.~~

~~**1438.1 Cooling Towers:** All cooling towers with a total fan motor horsepower greater than 10 hp shall be equipped with a variable speed drive or with a pony motor of a rated hp no greater than 1/3 of the hp of the primary motor. For pony motors, the cooling tower control shall provide two-stage operation of fans and shall bring the pony motor to operate without the primary motor while meeting the condenser water setpoint.~~

1438.1 **Heat rejection equipment:** The requirements of this section apply to heat rejection equipment used in comfort cooling systems such as air-cooled condensers, open cooling towers, closed-circuit cooling towers, and evaporative condensers.

Exception: Heat rejection devices included as an integral part of equipment listed in Tables 14-1A through 14-1D.

Heat rejection equipment shall have a minimum efficiency performance not less than values specified in Table 14-1G. These requirements apply to all propeller, axial fan and centrifugal fan cooling towers. Table 14-1G specifies requirements for air-cooled condensers that are within rating conditions specified within the table.

1438.1.1 Variable flow controls: Cooling tower fans 7.5 hp and greater shall have control devices that vary flow by controlling leaving fluid temperature or condenser temperature/pressure of the heat rejection device.

1438.1.2 Limitation on centrifugal fan cooling towers: Open cooling towers with a combined rated capacity of 1,100 gpm and greater at 95°F condenser water return, 85°F condenser water supply and 75°F outdoor wet-bulb temperature shall meet the energy efficiency requirement for axial fan open circuit cooling towers.

Exception~~s~~:

~~1.~~ Open circuit cooling towers that are ducted (inlet or discharge) or have external sound attenuation that requires external static pressure capability.

~~2. Cooling towers that meet the efficiency requirement for propeller fan towers.~~

~~**1438.1.3 Tower flow turndown.** Open cooling towers configured with multiple condenser water pumps shall be designed so that all cells can be run in parallel with the larger of:~~

~~1. The flow produced by the smallest pump, or~~

~~2. 33% of the design flow for the cell.~~

1438.2 Hot gas bypass limitation: Cooling equipment with direct expansion coils rated at greater than 95,000~~65,000~~ Btu/h total cooling capacity shall have a minimum of 2 stages of cooling capacity or capacity modulation other than hot gas bypass that is capable of reducing input and output by at least 50%. ~~Cooling systems shall not use hot gas bypass or other evaporative pressure control systems.~~

1438.3 Large volume fan systems: Single or multiple fan systems serving a zone or adjacent zones without separating walls with total air flow over 10,000~~7,500~~ cfm (3,540 l/s) are required to reduce airflow based on space thermostat heating and cooling demand. A ~~two-speed motor or~~ variable speed drive shall reduce airflow to a maximum ~~60~~ 75 percent of peak airflow or minimum ventilation air requirement as required by Section ~~304~~ 403 of the ~~Washington VIAQ code~~IMC, whichever is greater.

Exceptions:

1. Systems where the function of the supply air is for purposes other than temperature control, such as maintaining specific humidity levels or supplying an exhaust system.
2. Dedicated outdoor air supply unit(s) with heat recovery where airflow is equal to the minimum ventilation requirements and other fans cycle off unless heating or cooling is required.
3. An area served by multiple units where designated ventilation units have 50 percent or less of total area airflow and non-ventilation unit fans cycle off when heating or cooling is not required.

June 25, 2009

Log # 09-005:

Recommend Approval with Modifications:

402.1.1 Energy Budgets: Proposed buildings designed in accordance with this section shall be designed to use no more energy from non-renewable sources for space heating, ~~and~~ space cooling and domestic hot water heating than a standard building whose enclosure elements and energy consuming systems are designed in accordance with Section 502.2 of this Code for the appropriate climate zone and heating system type and cooling system and whose mechanical system type is the same as the proposed building and which complies with Section 503 of this Code. Energy derived from renewable sources may be excluded from the total annual energy consumption attributed to the alternative building.

402.1.2 Calculation of Energy Consumption: The application for a building permit shall include documentation which demonstrates, using a calculation procedure as listed in Chapter 8, or an approved alternate, that the proposed building's annual space heating, ~~and~~ space cooling and domestic hot water heating energy use does not exceed the annual space heating, ~~and~~ space cooling and domestic hot water heating energy use of a standard building conforming to Chapter 5 of this Code for the appropriate climate zone. The total calculated annual energy consumption shall be shown in units of kWh/ft^2-year or Btu/ft^2-year of conditioned area.

402.1.3 Input Values: The following standardized input values shall be used in calculating annual space heating budgets:

(No Changes to Table Values)

The standard building shall be modeled with glazing area distributed equally among the four cardinal directions.

Parameter values that may be varied by the building designer to model energy saving options include, but are not limited to, the following:

1. Overall thermal transmittance, U_O, of building envelope or individual building components.
2. Heat storage capacity of building.
3. Glazing orientation; area; and solar heat gain coefficients (where Chapter 5 does not contain SHGC requirements, the standard design shall be modeled with glazing SHGC as determined by Tables 13-1 and 13-2. SHGC values shall be determined in accordance with Section 1312.2.).
4. Heating system efficiency.

Parameter values that may not be varied:

1. Domestic hot water consumption.

Log # 09-009:

Recommend Approval with Modifications:

Replace previous proposal in its entirety with the following:

SECTION 504 — ~~SERVICE~~ DOMESTIC WATER ~~HEATING~~ SYSTEMS

504.1 Scope: The purpose of this section is to provide criteria for design and equipment selection that will produce energy savings when applied to ~~service~~ domestic water ~~heating~~ systems.

504.6 Pump Operation: Circulating ~~hot~~ water systems shall be controlled so that the circulation pump(s) can be conveniently turned off, automatically or manually, when the ~~hot~~ water system is not in operation.

504.8 Conservation of ~~Hot~~ Water

504.8.1 Showers and Lavatories: Showers and lavatories used for other than safety reasons shall be equipped with flow control devices or specially manufactured shower-heads or aerators to limit the total water flow rate as set forth in Chapter 51-56 WAC, as measured with both hot and cold faucets turned on to their maximum flow.

603.1: Group R Occupancies that are space heated by air-to-air, ground-to-air or water-to-air heat pumps shall comply with Table 6-1 or 6-2. System sizing shall be determined by an analysis consistent with Section 503.2 of this Code. All mechanical equipment efficiencies ~~and service water heating system efficiencies~~ shall comply with standards as stated in Section~~s~~ 503 ~~and 504~~ of this Code.

SECTION 604 — ~~RESERVED~~ DOMESTIC WATER SYSTEMS

Domestic water systems, including plumbing fixtures and appliances, shall comply with Section 504.

SECTION 1440 — ~~SERVICE~~ DOMESTIC WATER ~~HEATING~~ SYSTEMS

1444 Conservation of Water and Pumping Energy: Pumps for all domestic water systems shall comply with Section 1438.

Log # 09-011:

Recommend Approval with Modifications:

SECTION 701 — STANDARDS

The following standards shall apply to Chapters 1 through 20. The standards and portions thereof, which are referred to in various parts of this Code shall be part of the Washington State Energy Code and are hereby declared to be a part of this Code.

CODE STANDARD NO.	TITLE AND SOURCE
RS-1	~~2005~~ 2009 ASHRAE Fundamentals Handbook.
RS-2	Super Good Cents Technical Reference (Builder's Field Guide)
RS-3:	(Reserved.)
RS-4	ASHRAE Standard 55-2004 Thermal Environmental Conditions for Human Occupancy.
RS-5	2006 ASHRAE Refrigeration Handbook
RS-6	(Reserved) ~~SMACNA, Installation Standards for Residential Heating and Air Conditioning Systems, 6th Edition, 1988~~
RS-7	SMACNA, HVAC Duct Construction Standards, Metal and Flexible, ~~2nd Edition, 1995~~ 2005.
RS-8:	(Reserved) ~~SMACNA, Fibrous Glass Duct Construction Standards, 6th Edition, 1992.~~
RS-9	ASHRAE/IESNA Standard 90.1-~~2004~~2007, Energy Standard for Buildings Except Low-Rise Residential Buildings.
RS-10	~~2004~~ 2008 ASHRAE HVAC Systems and Equipment Handbook.
RS-11	~~2003~~ 2007 ASHRAE HVAC Applications Handbook.
RS-12 – RS-28:	(Reserved.)
RS-29	Nonresidential Building Design by Systems Analysis.
RS-30	Title 10, Code of Federal Regulations (CFR), Part 430 (March 14, 1988).
RS-31	National Fenestration Rating Council (NFRC) Standard 100-2004.
RS-32	Seattle EnvStd 2006

Log # 09-089:
Recommend Approval with Modifications:

602.7.2 Glazing U-Factor: The total glazing area as defined in Chapter 2 shall have an area weighted average U-factor not to exceed that specified in Table 6-1 or 6-2.
U-factors for glazing shall be determined in accordance with Section 502.1.5. These areas and U-factors shall also include any doors using the exception of Section 602.6. If the U-factors for all vertical and overhead glazing products are below the appropriate U-factor specified, then no calculations are required. If compliance is to be achieved through an area weighted calculation, then the areas and U-factors shall be included in the plans submitted with a building permit application.

EXCEPTION: Single glazing for ornamental, security, or architectural purposes and double glazed garden windows with a wood or vinyl frame shall be exempt from the U-factor calculations but shall have its area tripled and shall be included in the percentage of the total glazing area as allowed for in Table 6-1 or 6-2. The maximum area (before tripling) allowed for the total of all single glazing and garden windows is ~~20 square feet.~~1% of the floor area ~~or~~20 square feet, whichever is less. ~~If an unlimited glazing path is used, a glazing area equaling 20 square feet is exempt from U-factor requirements for ornamental, security, or architectural purposes.~~

Log # 09-091:
Recommend Approval with Modifications:

CHAPTER 8
~~**SUGGESTED SOFTWARE FOR CHAPTER 4**~~
~~**SYSTEMS ANALYSIS APPROACH FOR GROUP R OCCUPANCY**~~
~~Reserved~~

SUGGESTED SOFTWARE FOR SYSTEMS ANALYSIS APPROACH

The simulation program shall be tested according to ANSI/ASHRAE Standard 140 and the results shall be furnished by the software provider.

The following is the list of suggested software, but not limited to:

DOE 2.1E
Energy Science Technology Software Center (ESTSC)
PO Box 1220
Oakridge, TN 37831-1020
(423) 576-2606

DOE 2.1E or DOE 2.2 (EQuest)
James J. Hirsch & Associates
Building Performance Analysis
Software & Consulting
12185 Presilla Road
Camarillo, CA 93012-9243
(805) 532-1045

EnergyPlus
Kathy Ellington
Lawrence Berkeley National Laboratory (LBNL)
Building 90, Room 3147
Berkeley, CA 94720-0001
(510) 486-5711

Log # 09-119:
Recommend Approval with Modifications:

Replace previous proposal in its entirety with the following:

1323 Glazing: Glazing shall comply with Section 1312 and Tables 13-1 or 13-2. All glazing shall be, at a minimum, double glazing.

EXCEPTIONS: 1. Vertical glazing located on the display side of the street level story of a retail occupancy provided the glazing

a. is double-glazed with a minimum 1/2 inch airspace and with a low-e coating having a maximum emittance of e-0.40 or has an area weighted U-factor of 0.60 or less. (When this exception is used, there are no SHGC requirements), and

b. does not exceed 75 % of the gross exterior wall area of the display side of the street level story, measured from the top of the finished floor at street level. However, if the display side of the street level story exceeds 20 feet in height, then this exception may only be used for the first 20 feet of that story.

When this exception is utilized, separate calculations shall be performed for these sections of the building envelope and these values shall not be averaged with any others for compliance purposes. The 75% area may be exceeded on the street level, if the additional glass area is provided from allowances from other areas of the building.

2. Single glazing for ornamental, security or architectural purposes shall be included in the percentage of the total glazing area, U-factor calculation and SHGC as allowed in the Tables 13-1 or 13-2. The maximum area allowed for the total of all single glazing is 1% of the gross exterior wall area.

Log # 09-147:
Recommend Approval with Modifications:

1412.4 Setback and Shut-Off: HVAC systems shall be equipped with automatic controls capable of accomplishing a reduction of energy use through control setback or equipment shutdown during periods of non-use or alternate use of the spaces served by the system. The automatic controls shall:

a. Have a minimum seven-day clock and be capable of being set for seven different day types per week,

b. Be capable of retaining programming and time settings during loss of power for a period of at least ten hours, and

c. Include an accessible manual override, or equivalent function (e.g., telephone interface), that allows temporary operation of the system for up to two hours.

~~d. Each HVAC systems shall have optimum start controls that vary start-up time of system to just meet temperature set point at time of occupancy.~~

1412.4.2 Optimum Start Controls: Heating and cooling systems with design supply air capacities exceeding ~~10,000~~2,000 cfm shall have optimum start controls. Optimum start controls shall be designed to automatically adjust the start time of an HVAC system each day to bring the space to desired occupied temperature levels immediately before scheduled occupancy. The control algorithm shall, as a minimum, be a function of the difference between space temperature and occupied setpoint and the amount of time prior to scheduled occupancy.

Log # 09-149:
Recommend Approval with Modifications:

1412.5 Heat Pump Controls: Unitary air cooled heat pumps shall include microprocessor controls that minimize supplemental heat usage during start-up, set-up, and defrost conditions. These controls shall anticipate need for heat and use compression heating as the first stage of heat. Controls shall indicate when supplemental heating is being used through visual means (e.g., LED indicators). Heat pumps equipped with supplementary heaters shall be installed with controls that prevent supplemental heater operation above 40°F. ~~Compressor ambient lockout controls shall not prevent compressor operation when the outside temperature is above 10°F~~

Log # 09-151:
Recommend Approval with Modifications:

~~**1414.1 Sealing:** Duct work which is designed to operate at pressures above ½ inch water column static pressure shall be sealed in accordance with Standard RS-7. Extent of sealing required is as follows:~~

~~1. Static pressure: ½ inch to 2 inches; seal transverse joints.~~

~~2. Static pressure: 2 inches to 3 inches; seal all transverse joints and longitudinal seams.~~

~~3. Static pressure: Above 3 inches; seal all transverse joints, longitudinal seams and duct wall penetrations.~~

~~Duct tape and other pressure sensitive tape shall not be used as the primary sealant where ducts are designed to operate at static pressure of 1 inch W.C. or greater.~~

1414.1 Duct sealing and testing: Ductwork and plenums shall be sealed in accordance with ~~Tables 14-7 and 14-8~~Section 1414.1.1. Additionally, ducts ~~must meet the requirements~~ shall be tested in accordance with ~~of~~ Sections ~~1414.1.1 and~~ 1414.1.2 and 1414.1.3as required.

1414.1.1 **Sealing**: Duct work which is designed to operate at pressures above ½ inch water column static pressure shall be sealed as follows:

1. Static pressure ½ inches to 3 inches: Seal all transverse joints and longitudinal seams. Spiral lock seams in round and flat oval ductwork do not require sealing; however, other seams shall be sealed.

2. Static pressure above 3 inches: Seal all transverse joints, longitudinal seams and duct wall penetrations.

All low pressure supply and return air systems not located entirely within the conditioned space, including the unconditioned side of enclosed stud bays or joist cavities/spaces used to transport air, shall be securely fastened and sealed. Ductwork shall be sealed using welds, gaskets, mastic, or mastic-plus-embedded-fabric tape. Enclosed stud bays or joist cavities/spaces used to transport air shall be sealed using mastic-plus embedded-fabric tape or, when drywall is used to enclose the air system, drywall mud and tape. Duct tape is not permitted as a sealant on any ducts.

EXCEPTION: Fibrous glass duct systems installed in accordance with Standard UL 181A and flexible duct systems installed in accordance with Standard UL 181B may use tapes listed for these systems.

1414.1.2 Low pressure duct leak test. All duct systems shall be sealed to a leakage rate not to exceed 6 percent of the fan flow if the duct system:

1. Is connected to a constant volume, single zone, air conditioner, heat pump or furnace; and

2. Serves less than 5,000 square feet of floor area; and

3. Has more than 25 percent duct surface area located in any unconditioned space.

The leakage rate shall be confirmed through field verification and diagnostic testing, in accordance with SMACNA Duct Leakage Test Procedures - 1985.

~~1414.1.2~~1414.1.3 High pressure duct leak test. Ductwork that is designed to operate at static pressures in excess of 3 in. w.c. shall be leak-tested in accordance with SMACNA Duct Leakage Test Procedures – 1985. Representative sections totaling no less than 25 percent of the total installed duct area for the designated pressure class shall be tested. Duct systems with pressure ratings in excess of 3 in. w.c. shall be identified on the drawings. The maximum permitted duct leakage shall be:

$$L_{max} = C_L P^{0.65}$$

where
L_{max} = maximum permitted leakage in cfm/100 square feet duct surface area;
CL = duct leakage class, cfm/100 square feet at 1 in. w.c.,
CL = 6 for rectangular sheet metal, rectangular fibrous, and round flexible ducts,
CL = 3 for round/flat oval sheet metal or fibrous glass ducts; and
P = test pressure, which shall be equal to the design duct pressure class rating in in. w.c.

Delete Proposed Tables 14-7 and 14-8

Log # 09-159:
Recommend Approval with Modifications:

1439 Exhaust ~~Hoods~~ Systems

1439.1 Kitchen Hoods. ~~Individual~~ For each kitchen area with total exhaust ~~hoods~~ capacity larger than ~~5000~~ 2000 cfm shall be provided with make-up air sized so that at least 50% of exhaust air volume be (a) unheated or heated to no more than 60°F (15.55°C) and (b) uncooled or cooled without the use of mechanical cooling. ~~For each kitchen exhaust system with a total exhaust capacity greater than 3,000 cfm (1416 L/s), the fan motor shall be equipped with controls that reduce fan speed when reduced cooking activity is detected.~~

EXCEPTIONS: 1. Where hoods are used to exhaust ventilation air which would otherwise exfiltrate or be exhausted by other fan systems. A detailed accounting of exhaust airflows ~~must~~ shall be provided on the plans that accounts for the impact of any required demand controlled ventilation.

2. Certified grease extractor hoods that require a face velocity no greater than 60 fpm.

~~**1439.2 Fume Hoods:** Each fume hood in buildings with fume hood systems having a total exhaust rate greater than 15,000 cfm shall include at least one of the following features:~~

~~a. Variable air volume hood exhaust and room supply systems capable of reducing exhaust and make-up air volume to 50% or less of design values.~~

~~b. Direct make-up (auxiliary) air supply equal to at least 75% of the exhaust rate, heated no warmer than 2° F below room set point, cooled to no cooler than 3°F above room set point, no humidification added, and no simultaneous heating and cooling used for dehumidification control.~~

~~c. Heat recovery systems to precondition make-up air in accordance with Section 1436, without using any exception.~~

~~d. Constant volume fume hood designed and installed to operate at less than 50 fpm face velocity.~~

1439.2 Laboratory Exhaust Systems: Buildings with laboratory exhaust systems having a total exhaust rate greater than 5,000 cfm (2,360 L/s) shall include heat recovery systems to precondition makeup air from laboratory exhaust. The heat recovery system shall be capable of increasing the outside air supply temperature at design heating conditions by 25°F (13.9°C) in Climate Zone 1 and 35°F (19.4°C) in Climate Zone 2. A provision shall be made to bypass or control the heat recovery system to permit air economizer operation as required by Section 1433.

Exceptions:

1. Variable air volume laboratory exhaust and room supply systems capable of reducing exhaust and makeup air volume to 50 percent or less of design values; or
2. Direct makeup (auxiliary) air supply equal to at least 75 percent of the exhaust rate, heated no warmer than 2ºF (1.1ºC) ~~(-17ºC)~~ below room set point, cooled to no cooler than 3ºF (1.7ºC) ~~(-16ºC)~~ above room set point, no humidification added, and no simultaneous heating and cooling used for dehumidification control; or
3. Combined Energy Reduction Method: VAV exhaust and room supply system capable of reducing exhaust and makeup air volumes and a heat recovery system to precondition makeup air from laboratory exhaust that when combined will produce the same energy reduction as achieved by a heat recovery system with a ~~60~~50% sensible recovery effectiveness as required above. For calculation purposes the heat recovery component can be assumed to include the maximum design supply airflow rate at design conditions. The combined energy reduction (Q_{ER}) shall meet the following:

$Q_{ER} \geq Q_{MIN}$
$Q_{MIN} = CFM_S * (T_R - T_O) * 1.1 * 0.6$
$Q_{ER} = CFM_S * (T_R - T_O) * 1.1(A + B)/100$

where:
Q_{MIN}= Energy recovery at 60% sensible effectiveness (Btu/hr)
Q_{ER}= combined energy reduction (Btu/hr)

CFM_S = the maximum design supply airflow rate to conditioned spaces served by the system in cubic feet per minute
T_R=Space return air drybulb at winter design conditions
T_O= Outdoor air drybulb at winter design conditions
A = Percentage that the exhaust and makeup air volumes can be reduced from design conditions.
B = Percentage sensible heat recovery effectiveness.

June 26, 2009

Log # 09-016:
Recommend Approval with Modifications:

(See p. 51 for Revised Table 10-6B; all other tables not shown remain as proposed)

TABLE 10-6
OTHER THAN GROUP R OCCUPANCY:
DEFAULT U-FACTORS FOR VERTICAL GLAZING, OVERHEAD GLAZING AND OPAQUE DOORS

VERTICAL GLAZING

	U-Factor			
	Any Frame	Aluminum w/Thermal Break	Wood/ Vinyl/ Fiberglass Frame	~~Fiberglass Frame~~
Single	1.45	1.45	1.45	~~1.45~~
Double	0.90	0.85	0.75	~~0.70~~
1/2 Inch Air, Fixed/Operable	0.75/0.90	0.70/0.84	0.60/0.72	~~0.55~~
1/2 Inch Air, Low-$e^{(0.40)}$, Fixed/Operable	~~0.60~~ 0.70/0.84	~~0.55~~ 0.60/0.72	0.50/0.60	~~0.45~~
1/2 Inch Air, Low-$e^{(0.10)}$, Fixed/Operable	~~0.55~~ 0.65/0.78	~~0.50~~ 0.55/0.66	0.45/0.54	~~0.40~~
1/2 Inch Argon, Low-$e^{(0.10)}$, Fixed/Operable	~~0.50~~ 0.60/0.72	~~0.45~~ 0.50/0.60	0.40/0.48	~~0.35~~
Triple	0.75	0.55	0.50	~~0.45~~
1/2 Inch Air, Fixed/Operable	0.55/0.66	0.50/0.60	0.45/54	~~0.40~~
1/2 Inch Air, Low-$e^{(0.20)}$, Fixed/Operable	0.500.60	0.45/0.54	0.40/0.48	~~0.35~~
1/2 Inch Air, 2 Low-$e^{(0.10)}$, Fixed/Operable	0.45/0.54	0.35/0.42	0.30/0.36	~~0.25~~
1/2 Inch Argon, 2 Low-$e^{(0.10)}$, Fixed/Operable	0.40/0.48	0.30/0.36	0.25/0.30	~~0.20~~

The category for aluminum frame with a thermal break is as defined in footnote 7 to Table 10-6A.

OVERHEAD GLAZING: SLOPED GLAZING (INCLUDING FRAME)

	U-Factor			
	Any Frame	Aluminum w/Thermal Break	Wood/ Vinyl/ Fiberglass Frame	~~Fiberglass Frame~~
Single	1.74	1.74	1.74	~~1.74~~
Double	1.08	1.02	0.90	~~0.84~~
½ Inch Air, Fixed	0.90	0.84	0.72	~~0.66~~
½ Inch Air, Low-$e^{(0.40)}$, Fixed	~~0.72~~0.84	~~0.66~~0.72	0.60	~~0.54~~
½ Inch Air, Low-$e^{(0.10)}$, Fixed	~~0.66~~0.78	~~0.60~~.66	0.54	~~0.48~~
½ Inch Argon, Low-$e^{(0.10)}$, Fixed	~~0.60~~0.72	~~0.54~~0.60	0.48	~~0.42~~
Triple	0.90	0.66	0.60	~~0.54~~
1/2 Inch Air, Fixed	0.66	0.60	0.54	~~0.48~~

1/2 Inch Air, Low-e$^{(0.20)}$, Fixed	0.60	0.54	0.48	~~0.42~~
1/2 Inch Air, 2 Low-e$^{(0.10)}$, Fixed	0.54	0.42	0.36	~~0.30~~
1/2 Inch Argon, 2 Low-e$^{(0.10)}$, Fixed	0.48	0.36	0.30	~~0.24~~

This default table is applicable to sloped glazing only. (Sloped glazing is a multiple-lite glazed system [similar to a curtain wall] that is mounted at a slope greater than 15º from the vertical plane.) Other overhead glazing shall use the defaults in Table 10-6E.

OPAQUE DOORS

	U-Factor
Uninsulated Metal	1.20
Insulated Metal (Including Fire Door and Smoke Vent)	0.60
Wood	0.50
Other doors	See Table 10-6C

NOTES:
Where a gap width is listed (i.e.: 1/2 inch), that is the minimum allowed.
Where a low-emissivity emittance is listed (i.e.: 0.40, 0.20, 0.10), that is the maximum allowed.
Where a gas other than air is listed (i.e.: Argon), the gas fill shall be a minimum of 90%.
Where an operator type is listed (i.e.: Fixed), the default is only allowed for that operator type.
Where a frame type is listed (i.e.: Wood/Vinyl), the default is only allowed for that frame type. Wood/Vinyl frame includes reinforced vinyl and aluminum-clad wood.

Log # 09-020:
Recommend Approval with Modifications:

CHAPTER 12 ~~(RESERVED)~~
ENERGY METERING

~~**NOTE:** For Nonresidential Definitions, see Chapter 2.~~

1201 General. All buildings shall comply with Chapter 12. Whole building energy supply sources shall be metered to supply energy consumption data to the building owner to effectively manage energy.

Exceptions: 1. Group R occupancies.
2. Tenant spaces with utility-provided meters.

~~1201~~ 1202 Whole Building Energy Supply Meterings. Meters with remote metering capability or automatic meter reading (AMR) capability shall be provided to collect energy use data for each energy supply source to the building including gas, electricity and district stream, that exceeds the thresholds listed in Table 12-1. Utility company service entrance/interval meters are allowed to be used provided that they are configured for automatic meter reading (AMR) capability.

Table 12-1 Energy Source Meter Thresholds

Energy Source	Main Metering Threshold
Electrical service	> ~~200~~ 500 kVA
On-site renewable electric power	> 10 kVA (peak)
Gas and steam service	> 300 kW (1,000,000 Btu/h)
Geothermal	> 300 kW (1,000,000 Btu/h) heating
On-site renewable thermal energy	> 10 kW (30,000 Btu/h)

Master sub-metering with remote metering capability (including current sensors or flow meters) shall be provided for the systems that exceed the thresholds in Table 12-1 to collect overall totalized energy use data for each subsystem in accordance with Table 12-2:

Table 12-2 Component Energy Master Sub-Metering Thresholds

Component	Sub-Metering Threshold
Chillers/heat pumps systems	> 70 kW (240,000 Btu/h) cooling capacity
Packaged AC units systems	> 70 kW (240,000 Btu/h) cooling capacity
HVAC Fans systems	> 15 kW (20 hp)
Exhaust Fans systems	> 15 kW (20 hp)
Make-up Air Fan systems	> 15 kW (20 hp)
Pumps systems	> 15 kW (20 hp)
Cooling towers systems	> 15 kW (20 hp)
Boilers, Furnaces and other heating equipment systems	> 300 kW (1,000,000 Btu/h) heating capacity
General lighting circuits	> 15 kVA
Miscellaneous electric loads	> 15 kVA

Metering shall be digital-type meters for the main meter. Current sensors or flow meters are allowed for submetering. For subsystems with multiple similar units, such as multi-cell cooling towers, only one meter is required for the subsystem. Existing buildings are allowed to reuse installed existing analog-type utility company service/interval meters.

~~**1202 Meter Data Collection.** All building meters shall be configured to communicate energy consumption data to a meter data management system. At a minimum, meters shall provide data daily and shall record hourly consumption of energy which can be used to assess building performance at least monthly~~

~~**1203 Data Storage and Retrieval.** The meter data management system shall be capable of electronically storing energy meter data and creating user reports showing calculated hourly, daily, monthly and annual energy consumption for each meter.~~

1132.4 Metering: Where new or replacement systems or equipment is installed that exceeds the threshold in Table 12-1 or Table 12-2, metering shall be installed for that systems or equipment in accordance with Section 1201.

Log # 09-027:
Recommend Approval with Modifications:

1323 Glazing: Glazing shall comply with Section 1312 and Tables 13-1 or 13-2. All glazing shall be, at a minimum, double glazing. In addition, all glazing assemblies shall have at least one low-emissivity coating unless the glazing assembly has an overall U-factor that complies with the values in Table 13-1.

EXCEPTIONS: 1. Vertical glazing located on the display side of the street level story of a retail occupancy provided the glazing

a. (i) is double-glazed with a minimum 1/2 inch airspace and with a low-e coating having a maximum emittance of ~~e 0.40~~ e= 0.10 in a nonmetal frame or a metal frame having a thermal break (as defined in footnote 9 to Table 10-6B) or

(ii) has an area weighted U-factor of ~~0.60~~ ~~U 0.350~~.50 or less. (U-factor calculations shall use overall assembly U-factors. When this exception is used, there are no SHGC requirements), and

~~b. has a visible transmittance of (i) 0.60 or greater for the center of the glazing assembly in any type of frame or (ii) has an area weighted visible transmittance for the overall assembly including the frame of 0.52 or greater for fixed glazing and 0.44 or greater for operable glazing. Visible transmittance shall be determined in accordance with Section 1312.2, and,~~

~~((~~b~~))~~c. does not exceed 75 % of the gross exterior wall area of the display side of the street level story. However, if the display side of the street level story exceeds 20 feet in height, then this exception may only be used for the first 20 feet of that story.

When this exception is utilized, separate calculations shall be performed for these sections of the building envelope and these values shall not be averaged with any others for compliance purposes. The 75% area may be exceeded on the street level, if the additional glass area is provided from allowances from other areas of the building.

2. Single glazing for security purposes and~~for ornamental, security or architectural purposes~~ ~~shall be limited to~~ vestibules and revolving doors ~~and~~ shall be included in the percentage of the total glazing area, U-factor calculation and SHGC as allowed in the Tables 13-1 or 13-2. The maximum area allowed for the total of all single glazing is 1% of the gross exterior wall area.

Log # 09-057:
Recommend Approval with Modifications:

Do not include in Section 1512.1 Exempt Spaces.
Instead, add to list in Section 1512.2 Exempt Lighting Equipment (See p. 13)

Log # 09-062:
Recommend Approval with Modifications:

1513.6 Automatic Shut-Off Controls, Interior: ~~Buildings greater than 5,000 ft^2 and all school classrooms~~ All buildings shall be equipped with separate automatic controls to shut off the lighting in all spaces during unoccupied hours. Within these buildings, all office areas less than 300 ft^2 enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, shall be equipped with occupancy sensors that comply with Section 1513.6.1. For other spaces, automatic controls may be an occupancy sensor, time switch or other device capable of automatically shutting off lighting.

EXCEPTIONS:
1. Areas that must be continuously illuminated (e.g., 24-hour convenience stores), or illuminated in a manner requiring manual operation of the lighting.
2. Emergency lighting and ~~pathway lights~~ means of egress illumination as required by code that are automatically OFF during normal building operation. ~~Emergency lighting systems.~~
3. Switching for industrial or manufacturing process facilities as may be required for production.
4. 24-hour occupancy areas in ~~Hospitals~~ hospitals and laboratory spaces.
5. Areas in which medical or dental tasks are performed are exempt from the occupancy sensor requirement.
6. Dwelling units.

1515 Egress Lighting: ~~Egress and pathway lights that are~~ Emergency lighting and means of egress illumination that is normally ON during normal building operation shall, during periods that the building space served by the means of egress is unoccupied, be shut off and controlled by a combination of listed emergency relay and occupancy sensors.

Log # 09-143:
Recommend Approval with Modifications:

(Portions of proposal not shown remain as proposed)

1310.3 Cold Storage and Refrigerated Spaces: Exterior and interior surfaces of Frozen Storage Spaces or Cold Storage Spaces in refrigerated warehouses may comply with either the prescriptive or component performance approach using insulation values in Table 13-3. The remainder of refrigerated warehouse area containing conditioned or semi-conditioned spaces shall comply by using either the prescriptive or component performance approach using Tables 13-1 and 13-2.

Exceptions: 1. Areas within refrigerated warehouses that are designed solely for the purpose of quick chilling or freezing of products with design cooling capacities of greater than 240 Btu/hr-ft2 (2 tons per 100 ft2).
2. Controlled atmosphere storage exterior floor and partition wall insulation.

TABLE 13-3
REFRIGERATED WAREHOUSE INSULATION

SPACE	SURFACE	MINIMUM R-VALUE (˚F-hr-f^2/Btu)
Frozen Storage Spaces	Exterior Roof/Ceiling	R-36
	Exterior Wall	R-36
	Exterior Floor	R-36
	Interior Partition [1]	R-28
Cold Storage Spaces	Exterior Roof/Ceiling	R-28
	Exterior Wall	R-28
	Interior Partition [1]	R-19

[1] Interior partitions include any wall, floor, or ceiling that divides Frozen Storage Spaces or Cold Storage Spaces from each other, conditioned spaces, unconditioned spaces, or semi-conditioned spaces.

Log # 09-154:

Recommend Approval with Modifications:

(Portions of proposal not shown remain as proposed)

1432.3.1 Hydronic Flow Criteria: HVAC chilled water, condenser water, and hot water pumping shall be designed for variable fluid flow and shall be capable of reducing pump flow rates to no more than the larger of 50 percent or less of the design flow rate; or the minimum flow required by the equipment manufacturer for proper operation of equipment served by the system.

Exceptions:
1. Heating, chilled, and heat pump water systems that include three or fewer control valves and have a total pump system power less than or equal to 3 hp (2.2 kW).
2. Systems having a total pump system power less than or equal to 1-1/2 hp (1.1 kW).
3. Condenser water systems for chillers ~~with capacities less than 780,000 Btu/hr (2,662 kW)~~.

Log # 09-167/026:

Recommend Approval with Modifications:

Modifications made to #167 modify changes made in 026 as follows:

1322 Opaque Envelope: Roof/ceilings, opaque exterior walls, opaque doors, floors over unconditioned space, below-grade walls, slab-on-grade floors and radiant floors enclosing conditioned spaces shall be insulated according to Section 1311 and Tables 13-1 or 13-2. Compliance with nominal R-values shall be demonstrated for the thermal resistance of the added insulation in framing cavities and/or insulated sheathing only. Nominal R-values shall not include the thermal transmittance of other building materials or air films.

For metal frame assemblies used in spaces with electric resistance space heat, compliance shall be demonstrated with the component U-factor for the overall assembly based on the assemblies in Chapter 10.

Area-weighted averaging of the R-value is not allowed. When showing compliance with R-values, the minimum insulation R-value for all areas of the component shall comply with Table 13-1. When calculating compliance using U-factors, area-weighted averaging is allowed. Where insulation is tapered (e.g. roofs), separate assembly U-factors shall be calculated for each four-foot section of tapered insulation.

EXCEPTION~~S~~S: ~~1.~~1. Opaque smoke vents are not required to meet insulation requirements.

2. For prescriptive compliance only, for glazing areas that are 30% and less of the gross wall area, the insulation of the perimeter edge of an above grade floor slab which penetrates the exterior wall may be reduced to R-5 provided the glazing U-factor is reduced to U-0.05 below that required in Tables 13-1 and 13-2. ~~:~~

~~a. For glazing areas that are 30% and less of the gross wall area, the insulation of the perimeter edge of an above grade floor slab which penetrates the exterior wall may be reduced to R-5 provided the glazing U-factor is reduced to U-0.05 below that required in Tables 13-1 and 13-2.~~

~~b. For glazing areas that exceed 30% of the gross wall area, the perimeter edge of an above grade floor slab which penetrates the exterior wall may be left uninsulated provided the glazing U-factor is reduced by U-0.10 below that required in Tables 13-1 and 13-2.~~

Log # 09-170:
Recommend Approval with Modifications:

~~Table 13-1~~
~~Add footnote.~~
~~Acceptable Software for Energy code Compliance, Climate Zone I only~~
~~a) Seattle Envelope Standard, ENV-STD~~.

SECTION 1330 — COMPONENT PERFORMANCE BUILDING ENVELOPE OPTION

1331 General: Buildings or structures whose design heat loss rate (UA_p) and solar heat gain coefficient rate (SHGC * A_p) are less than or equal to the target heat loss rate (UA_t) and solar heat gain coefficient rate (SHGC * A_t) shall be considered in compliance with this section. The stated U-factor, F-factor or allowable area of any component assembly, listed in Tables 13-1 or 13-2, such as roof/ceiling, opaque wall, opaque door, glazing, floor over conditioned space, slab-on-grade floor, radiant floor or opaque floor may be increased and the U-factor or F-factor for other components decreased, provided that the total heat gain or loss for the entire building envelope does not exceed the total resulting from compliance to the U-factors, F-factors or allowable areas specified in this section.

EXCEPTION: Compliance is also allowed to be shown using RS-32 for Climate Zone1 except for buildings containing attic roofs, wood framed walls or vertical fenestration with nonmetal frames, or for Group R occupancies.

Energy Code Criteria

Residential (RCW 1927A.045)

(AA) …the council may amend any provisions of the Washington state energy code to increase the energy efficiency of newly constructed residential buildings

Nonresidential (RCW 19.27A.025)

(BB) Such amendments increase the energy efficiency of typical newly constructed nonresidential buildings; and

(CC) Any new measures, standards, or requirements adopted must be technically feasible, commercially available, and cost-effective to building owners and tenants.

Policy Criteria

WAC 51-04-020 Policies for the consideration of proposed state-wide amendments

(1) The amendment is needed to address a critical life/safety need.
(2) The amendment is needed to address a specific state policy or statute (See RCW 19.27.020 Below).
(3) The amendment is needed for consistency with state or federal regulations.
(4) The amendment is needed to address a unique character of the state.
(5) The amendment corrects errors and omissions.

Objective Criteria

RCW 19.27.020 Purposes--Objectives--Standards.

(A) To require minimum performance standards and requirements for construction and construction materials, consistent with accepted standards of engineering, fire and life safety.
(B) To require standards and requirements in terms of performance and nationally accepted standards.
(C) To permit the use of modern technical methods, devices and improvements.
(D) To eliminate restrictive, obsolete, conflicting, duplicating and unnecessary regulations and requirements which could unnecessarily increase construction costs or retard the use of new materials and methods of installation or provide unwarranted preferential treatment to types or classes of materials or products or methods of construction.
(E) To provide for standards and specifications for making buildings and facilities accessible to and usable by physically disabled persons.
(F) To consolidate within each authorized enforcement jurisdiction, the administration and enforcement of building codes.

Economic Impact

+	Increases cost		FC	First Cost
–	Decreases cost		EC	Enforcement Cost
			OC	Ongoing Cost
SBI	Small Business Impact			

Recommendation

AS	Approval as Submitted
D	Disapproval
AM	Approval with Modifications (see attached)
AO	Approval with Options (see attached)